AUGUST 1955

VOLUME 4, NUMBER 8

Battelle Technical Review

IN THIS ISSUE:

Trends in Industrial Research

THEORETICAL PHYSICIST

JULIUS H. CAHN

Applied research laboratories frequently are driven by the fast pace of today's economic life to try to find quick and effective answers to technological problems. This calls for special research techniques, and some institutions have worked out effective short cuts to help them meet the challenge. As a member of the staff of such a laboratory, Julius H. Cahn says that he has come to appreciate the vast reservoir of scientific and technical knowledge available from his colleagues. He points out that their combined knowledge and know-how make possible a saturated attack on almost any problem.

As a theoretical physicist, Jules, as he's known by his colleagues, makes good use of these short cuts. When he can't find what he needs in his books, he "picks the brains" of his colleagues. Since his association with Battelle began in 1951, Jules has applied theoretical methods to the investigations of problems relating to the electrical characteristics of the Yagi antenna; operation of underwater arcs; improvement of the luminous efficiency of arcs for motion picture projectors; calculation of continuous X-ray spectra in soft X-ray sterilization; calculations on sensitivity to X-radiation of films and detectors; fundamentals of friction in aircraft brakes; and scattering of thermal radiation for prevention of frost damage. He has also surveyed methods for the nondestructive testing of roads and investigated procedures for measuring the metallic content of scrap.

After receiving an A.B. in physics from Yale University, Jules participated in radar component development for the U. S. Army Signal Corps and in the development of methods for separating U-235 for the Manhattan Project. Thereafter, he returned to Yale for both an M.S. and Ph.D. in physics. Before joining Battelle, he served for several years as assistant professor of physics at the University of Nebraska.

A father of two small children, Jules still finds time to enjoy the piano, bass violin, and cello, often as a member of an ensemble. He is a motorcycling enthusiast and plays tennis to keep in trim.

Volume 4, Number 8
August 1955

BATTELLE TECHNICAL REVIEW

Dedicated to the dissemination of knowledge. Published monthly by Battelle Memorial Institute, an endowed foundation serving mankind through science and technology.

Published monthly by Battelle Memorial Institute. Please address all correspondence about articles, abstracts, subscriptions and exchanges to: The Editor, Battelle Technical Review, Battelle Memorial Institute, 505 King Avenue, Columbus 1, Ohio. Accepted as controlled publication at Columbus, Ohio. Printed in the U. S. A.

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The Man in the Laboratory

HE IS MORTAL—LIKE OTHER MEN. He is born and he dies like other mortals. He lives, laughs, loafs, and loves like other men. He is just an ordinary human being—and yet he is something more.

He is distinguished from others by the use he makes of his mind. His work is essentially a mental process. He may not view himself as a part of the Universal Mind—trying to bring order out of chaos and forever discovering new chaos to replace the old. But that is what he does.

He has been romanticized and glamorized. But he has also been feared and distrusted. Society has seized upon the fruits of his labor and hailed him as the conqueror of Malthus. But in other times it has seen in him a challenge to established notions—a threat to the *status quo*. He has on occasion been forced to recant. Cries have sometimes arisen to suppress him and all his works.

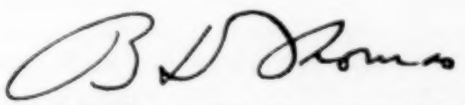
He is perverse and discontented. His perversity arises out of the confidence he must have in himself, in his own ideas, and in the operation of his own mind. And out of the full measure of his discontent arise his greatest achievements. Contentment with things as they are is not for him. He is one who will try for hours to find an easy way to do a thing that can be done the hard way in minutes. He is at war with that he loves most—Nature. He is a dreamer—but one who is not content with a dream. From out the fantasy of ideas and whirling atoms he seizes something not yet real, but which holds a promise of fulfillment of some hidden hope and aspiration. Under his sensitive hand the atoms and electric charges follow the paths destined by him; gases condense, liquids congeal, currents start to flow, and an idea takes physical form.

He may not be aware of—or he may ignore—the significance of the time in which he lives. He may live his life removed from the social upheaval which storms about him. He may be used by politicians; he may lend himself unwittingly to schemes and schemers. He may not see himself as having a part—possibly the leading part—in the most tremendous scene of change that has ever been played in the drama of human life.

He is modest and humble when such a thought is presented to him. He conceives of himself as merely a useful citizen—which he most assuredly is. But he is more. He is an explorer, a discoverer. He is, as Wordsworth says:

"A mind forever
voyaging through strange seas of thought alone."

Where he leads, the world will someday follow. Mankind will travel his lonely uncharted path to new realms of peace and happiness. Perhaps someday he may rest content knowing this.



Vice President, Battelle Memorial Institute

STUDY IN PLANT PATHOLOGY

Plants are being sprayed for the purpose of evaluating an experimental pesticide. Such evaluation is an important step in many research programs relating to the development of more effective chemical fungicides, insecticides, herbicides, growth-control regulators, and soil fumigants. Battelle facilities provide insects, as well as plants, for continuous, year-round study on such problems.

Trends in Industrial Research*

Research, with its improving techniques and expanding facilities, is playing a decisive role in the growth of our economy. Evidence suggests that it will play an even more significant role in the future. This is the first of two parts of Dr. Williams article.

by CLYDE WILLIAMS

THE TITLE "TRENDS IN INDUSTRIAL RESEARCH" implies that research is dynamic—that as a mechanism for industrial progress, it is not standing still. The implication is deliberate, and in this article I hope to point out how research is evolving and what this evolution means to the American industrial economy.

In part I, the trends in research *per se* will be discussed. In part II, we shall consider the various technical areas in which research is making rapid forward strides, or the trends in technical development that will affect the future of industry. In both sections, the aim is to interpret current changes in light of what they mean to industry and particularly to people concerned with the future of investments.

Basic to our discussion is the growth and increased use of research by industry. This growth seems obvious, since we see research activity and the results of research all about us. But not until one analyzes growth statistics does he get an appreciation of just what has happened in recent years. He finds, much to his surprise, that research is not only one of the younger industrial functions, but that as a fully recognized procedure for corporate progress it is hardly more than 15 years old.

Let's look at these statistics, going back first to 1929, the last boom year before the great depression.

INCREASING SIGNIFICANCE OF RESEARCH

In 1929, expenditures for research in this country amounted to only $160 million. This included industrial research, military research, university research, medical research, agricultural research—all the physical and biological sciences. Even though we thought we were scientific-minded at that time and in the scientific era, research expenditures actually accounted for only 0.15 per cent of our gross national product. Last year, in contrast, total research expenditures amounted to $3.75 billion or 1.25 per cent of our gross national product—more than 23 times as much dollar-wise and nine times as much in relation to gross national product.

What is the meaning of this great increase in research activity? By tracing the history of research through the past 25 years, we can get an answer.

Throughout the thirties, research remained a minor activity in this country, although it grew gradually. We were well along with preparations for World War II before the dollar volume doubled the 1929 rate. Even as late as 1940, total U. S. research accounted for the expenditure of only $345 million per year. Then, as the impact of war hit our economy, bringing with it problems that had to be solved for our very survival, research grew rapidly. The one-billion dollar

* Based in part on lectures presented at the Life Officers Investment Seminar, American Life Convention, Beloit, Wisconsin, June 20 and 21, 1955.

Known today as one of the country's leaders in science and research, Dr. Williams is a keen and thoughtful interpreter of the role of research in the world's economy. His diverse business, governmental, and educational affiliations are numerous and include memberships on the boards of the RAND Corporation and of the Philiadelphia Fund. Currently he is participating in Hoover Commission studies as well as atomic studies of the United States Chamber of Commerce. Trained as a chemical engineer, the author joined Battelle at its founding in 1929. Today he is its president and director and a member of the Board of Trustees.

mark was surpassed in 1943, and by the end of the war the country was spending for research at the rate of $1.3 billion per year.

Research—The New Frontier

Many people thought that when the war was over, industrial research would shrink, along with an expected contraction in industrial output. But industry had learned an important lesson through war research. It not only had a backlog of technical developments ready for commercial exploitation, but it had discovered scientific research as a new frontier. This frontier could be just as important as the old frontiers of land and natural resources for spurring economic activity. By investing in research, a company could develop new products to add to its present line, improve old products, cut production costs, find diversification opportunities, and solve raw materials difficulties.

The result was that industry took up what slack occurred temporarily in governmental research and added to it. Whereas, governmental research dropped from $880 million in 1945 to $660 million in 1946, nongovernmental research increased from $420 million to $830 million in the same period. The net result was a swelling of the total research activity by $190 million in the first peacetime year. Then, in 1947, governmental research started upward again, to further swell the sharp increases being made in industrial research. The $2 billion mark was surpassed in 1948 and the $3 billion mark five years later. The current rate is at least $3.75 billion, and before the year is over it may reach $4 billion.

The graph on the next page shows research as a per cent of gross national product. It was 0.15 per cent in 1929; 0.34 per cent in 1940; and 0.60 per cent in 1945. It rose to 1.25 per cent last year. As the curve shows, although research is becoming an increasingly large part of the nation's total productive effort, it is still a relatively small activity. Great as its benefits are, it is not costly. Its cost is far less than the sales and "nuisance" taxes imposed on goods in many states and is about as much a drag on the economy as a whole as the cost of a daily newspaper is on the budget of the average American household.

Obviously, the present growth of research cannot continue indefinitely. Sooner or later a point of diminishing returns will be reached. But it is equally obvious that research has a long way to go before it approaches this point.

It is known that some industries can support research activities up to one-eighth the amount of net sales. In the aircraft industry, as you can see from Figure 3 on page 96, research expenditures run about 13 per cent of net sales; in the electrical machinery industry, they are more than 6 per cent; and in the chemical industry, they are 2.5 per cent. The average for all industries is 2 per cent. A doubling, tripling, or even quadrupling of present over-all industrial expenditures would seem possible before absolute economic limits are reached.

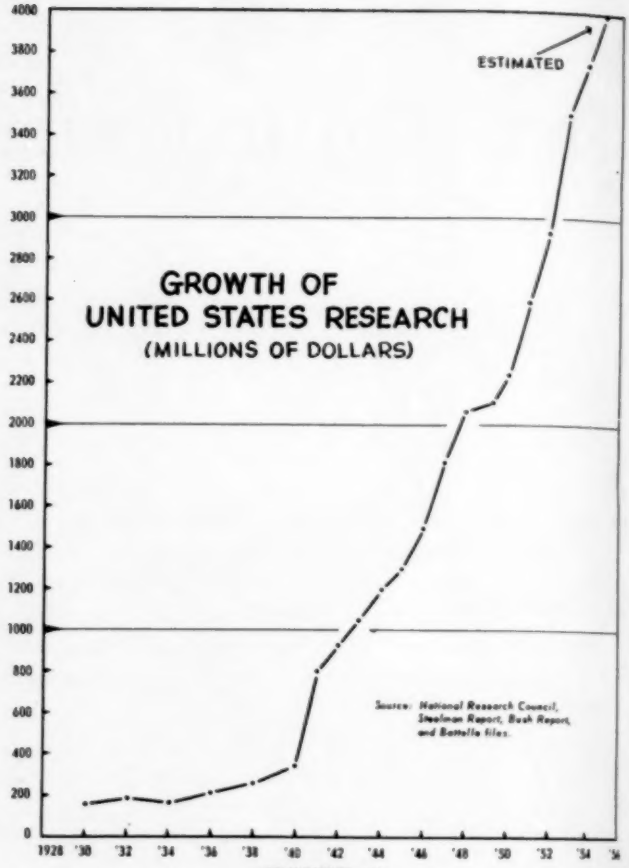


FIGURE 1

So, research as we know it today, is really a new force of significance in our industrial economy, and in considering its effect on the future, we must keep this fact in mind. We cannot predict future rates of economic change by rates of change that have occurred in the past. And, because research is such a potent force, old traditional economic patterns and cycles should be regarded with suspicion. We are still awaiting the arrival of the business depression that was supposed to come shortly after the end of World War II. New products and new industries arising from research, probably more so than expenditures for defense and the Korean War, prevented its materialization.

The use of the laboratory as a frontier for new industrial opportunities has resulted in what some writers call a "Technological Revolution". And the beginning of this revoluton was about 1940, when research "took over" as the primary basis for industrial expansion. Figure 4 on page 98 compares gross national product, or the country's total production of goods and services, with expenditures for research. You will note that the country's productivity kept right on going upward after World War II, along with the curve for research—the best evidence of the reality of a Technological Revolution.

I. Accelerated Progress Through Team Research

Rapid growth is not the only trend observable in industrial research. The character of research is vastly different from what it was a few decades ago. Methods and procedures, requirements in men and equipment, productivity, tempo, industrial attitudes toward the research function, the perspective and outlook of research people—all have changed. Research is being made a more precise instrumentality for accomplishing a job—for helping industry solve its technical and competitive problems. And it is also being democratized—being made available to more companies.

We can gain an understanding of these trends by looking at them one by one. A little history will set the stage.

Our early inventions came from two sources—private inventors, who conceived ideas and carried on experiments, and university professors, who pursued inquiry in their respective disciplines. Sometimes industry employed these people to work on problems in their spare time, and such employment constituted the beginning of applied research. We know, for instance, that the U. S. Navy from its establishment in 1789 employed inventors to improve existing devices and to develop new ones. Records also show that private companies engaged backyard inventors and men in the learned professions to work on specific problems as early as the latter part of the eighteenth century. Not until after the U. S. Department of Agriculture was organized in 1862, however, did applied research become more than a spare-time activity of university scientists. The first university in the United States to recognize graduate research as a major function was Johns Hopkins, founded in 1876. Industry did not begin the formal organization of research laboratories until the twentieth century. The General Electric Company is usually credited as the first firm in the United States to organize research as a separate and continuing activity. Its laboratory was founded in 1900. Even as late as 1915, there were only about 100 industrial research laboratories in the United States in contrast to some 3000 today.

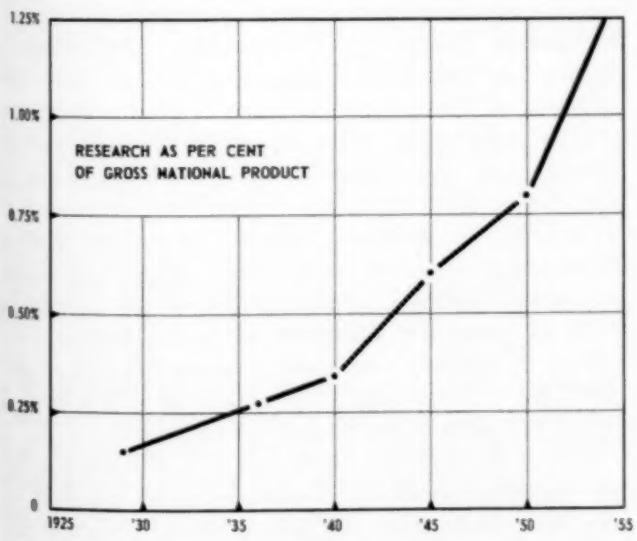


FIGURE 2

Individualistic Research

Since in the first one-hundred years of our national existence, research was a spare-time activity of inventors and university people, it was completely individualistic. The inventor and the university scientist worked by himself, experimenting, making observations, and profiting by his failures. He was a lone-wolf and his auditing problems, even when difficult, were not complex. He used whatever scientific information he had or could get and then experimented exhaustively—and haphazardly. He more than figuratively "tried everything on the shelf". Because science and technology were relatively simple—and because we had reached a stage in our civilization at which the time was ripe for basic technical discoveries—he was frequently outstandingly successful. But for every success achieved, there were hundreds of dismal and even ludicrous failures. And even the successes were often extremely costly. Edison, for instance, spent $40,000—in the good hard dollars of his day—to develop the

first carbonized-thread lamp filament and $100,000 more just to find the best natural fiber from which to make filaments.

Research remained highly individualistic long after formal research laboratories were organized. The idea of cooperative effort among scientists to expedite invention, discovery, and the solution of technical problems evolved gradually and painfully. It was natural, of course, for people working in the same laboratory to consult with each other on problems, and a rough sort of teamwork soon grew up in each laboratory. Routine laboratory tasks, such as chemical analysis and mechanical testing, were the first to become compartmentalized. Then it was just a step to breaking the problem down into its component segments discipline-wise and assigning each segment to a specialist. But for a long time it was heretical to think formally of using groups of specialists to attack research problems. This would kill individual initiative and professional development, it was thought, and would reduce the scientist to the status of an automaton on a problem-solving production line. It took some outstanding examples of successful group research, and pressure from industry for higher efficiency in research, to dispel these notions. The tremendous success of the Manhattan Project during World War II in using the combined efforts of thousands of scientists to develop the atomic bomb finally proved conclusively the efficacy of cooperative effort. Now, all modern laboratories use teams of scientists in attacking problems, and such teams can accomplish in six months or a year what would take a life-time of individual effort.

As you can readily see, this development of cooperative research has a tremendous effect on our industry and on our economic life. We can now compress into a few years the technological development that would otherwise have required decades—perhaps even a half century. This fact makes scientific investigation of increased value to industry, since a company can reasonably expect to derive quick returns from its research investments. The work in progress in the laboratory one year may be the basis for cost savings the next year, or for stock dividends the year after that.

Team research is nothing mysterious, but is merely the use of specialists to solve the various phases of the problem. Usually a coordinating body, composed of men with broad experience in the fields of science or technology that are applicable, appraises the problem, determines the most promising courses of action, and assigns whatever specialists are needed to work on the component parts. As information is developed, it comes back to the coordinating group, which pieces the pattern together and determines how the research in each speciality will affect the over-all problems. On the basis of the developing information, modifications in strategy are made as the work progresses and unfruitful endeavor is quickly eliminated. Since each scientist in the laboratory is actually working in his field of high proficiency, there is no wasted effort while a man acquaints himself with some science or technology foreign to his training. The research worker, instead of being an automaton as early opponents of team research feared, actually is given greater opportunity to develop professionally. A metallurgist, say, specializing in steel metallurgy, or a chemist, specializing in sugar chemistry, becomes just as expert in his field as a specialist in surgery, with a comparable degree of professional recognition. Most important, the steel metallurgist or sugar chemist is able to make new contributions to his field—which would be virtually impossible, merely because of the shortness of human life, if he had to be well informed in all branches of metallurgy or chemistry.

If a problem involves only one field of science, overall coordination of the research may be handled by one man. Many commonplace industrial problems fall into this category, and the coordinator is frequently a

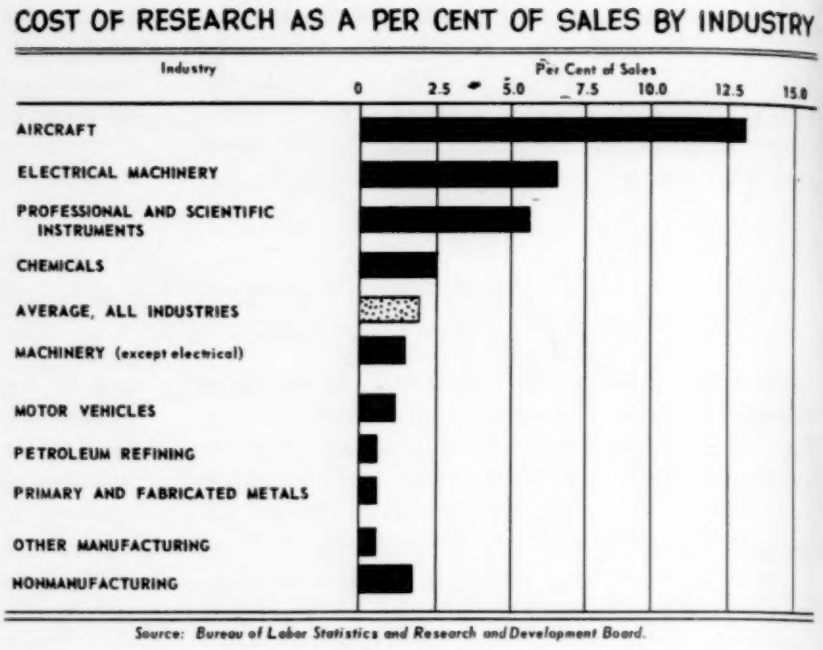


FIGURE 3

senior scientist working in the laboratory with several specialized assistants.

My own organization, Battelle Institute, founded in 1929, was one of the pioneers in the development of team research methods. An example of a research study from Battelle might be helpful in illustrating team research and the facility with which it solves difficult industrial problems.

Example of Team Research

In 1944-45, oil-well drillers in the Permian Basin oil fields of West Texas were having trouble with drill-pipe breakage. New strings of drill pipe would twist off far under the ground, necessitating expensive "fishing" operations and replacement. Drill pipe was costly, and labor and material losses were running into the millions. The American Association of Oilwell Drilling Contractors came to Battelle with the problem.

After review of all the known factors, our coordinating committee sent a metallurgical engineer to the Permian Basin to examine broken drill pipe and talk to men in the field. He began shipping specimens of damaged pipe to Columbus, and in a few weeks metallurgists and metallographers were busy sectioning the specimens, and physicists and experts in materials engineering, aided by corrosion chemists, electrical engineers, and geologists, were evolving a theory to account for the failures. Our teams of specialists quickly determined that drill-pipe failure was due to corrosion fatigue, induced by the peculiar drilling conditions of the area.

With the cause of failure determined, the problem was to find a way to prevent it. Since corrosion-resistant pipe was too costly, it was necessary to find ways to reduce or prevent corrosion and fatigue-crack formation without changing the steel. A number of approaches were suggested. We set chemists to work to find chemical inhibitors and develop plastic coatings for pipe interiors; nonferrous metallurgists and electrochemists, to develop metal-plating processes; mechanical engineers and physicists to devise operating procedures to reduce stress concentrations during drilling; and electrical engineers and nondestructive inspection specialists to develop field procedures for revealing fatigue cracks before failures occur.

In the laboratory work, our engineers and physicists found that the operating lifetime of pipe specimens could be increased from 10 to 100 times by reducing the bending stresses. A practical field method for reducing bending stresses was worked out by our mechanical engineers. Our chemists and electrochemists, in the meantime, found that the addition of sodium chromate to the drilling fluid would increase pipe life as much as four times, and that plastic coatings and zinc plating would increase pipe life up to 150 times. Our electrical engineers came up with visual and magnetic field methods for detection of fatigue cracks in pipe before breakage, and our corrosion specialists showed that pipe life could be doubled by certain cleaning practices.

The final result of the study was a set of drilling practice recommendations. These were made by Battelle within ten months after the project was initiated. They were adopted by drilling contractors, and a little over a year after the research started, drill-string failure ceased to be a problem in the Permian Basin.

It is interesting to note that the research cost the drillers' association $20,000. Despite the fact that many specialists were used, the total time charges of these men did not aggregate appreciably. By old-fashioned research methods, it is doubtful that one man could have even found the cause of the trouble within a lifetime, let alone provide a remedy. Against the $20,000 that the project cost the drilling contractors, consider the economic benefits: Before the Battelle drilling practices were put into effect, individual contractors frequently lost as much as $100,000 on a single drill hole. Gross annual losses ran into millions. The entire research costs were recovered by the contractors in less than one week of normal drilling operation!

II. Facilities for Modern Research

By this time, it must be obvious to you that there have been drastic changes in the requirements of men and equipment for research. Obviously, the use of specialists for cooperative research requires highly trained personnel. And for team research to be effective, the individual laboratory must be able to maintain a well-rounded and diversified staff. How, you may ask, can small companies provide adequate personnel for team research? And since specialists must have specialized tools, how can the small company pay for such tools?

The answer to these questions is that small com-

panies *cannot* provide the manpower and equipment for *effective* team research. Unless a company has a capitalization of at least a million dollars and gross annual sales of five million dollars, it cannot support much in the way of a research laboratory, although it may have an excellent control and testing laboratory. Some pieces of research equipment cost up to $100,000 or more. In fact, at Battelle, we have individual items of equipment costing up to $250,000. It is not uncommon for a typical problem of a small company to require the temporary use of several millions of dollars in research equipment for its solution—or more than the capitalization of the company. And, for the solution of a problem, the part-time services of a dozen or more highly trained specialists might be required.

But the situation is not hopeless, and more small companies are now actually engaged in scientific research than ever before. They accomplish this seemingly paradoxical feat by contracting with large central laboratories for research on their problems. They buy research services, just as they buy advertising or printing, and in so doing, are spared all the capitalization costs of a large, well-staffed laboratory. In effect, they put all or nearly all of their budget for research into its prosecution *per se*, thereby increasing the rate of their progress while at the same time avoiding heavy outlays for equipment and the maintenance of a staff.

Contract Research Services

There are three types of organizations that provide contract research services. These are: commercial laboratories, independent nonprofit research institutes, and research foundations associated with universities. The regular graduate schools of universities also conduct much research for industry on a fellowship basis, although the emphasis here is usually on fundamental research and the training of research personnel, rather than on the solving of immediate problems of great industrial significance. Sometimes, the laboratories of large corporations also contract to handle research problems of noncompetitive companies, and when this is done, the corporation laboratory is actually acting as a commercial research laboratory.

There are a great many consulting and commercial laboratories serving industry. Most have specialized fields and the emphasis is on consultation and testing rather than research. A few of the larger ones, however, conduct investigations in diversified fields of applied and fundamental science. One of the largest and best known is Arthur D. Little, Inc., in Cambridge, Massachusetts. This laboratory contracts for the execution of research projects and operates to make a profit. Arthur D. Little has a staff of 800, and in 1954 did $9 million in business.

Nonprofit Research Institutes

The nonprofit research institutes, although fewer in number, have reached a higher development in providing a general research service to industry. Included in this group are the Armour Research Foundation, in Chicago; Battelle Institute, in Columbus; Mellon Institute, in Pittsburgh; Cornell Aeronautical Laboratory, in Buffalo; Franklin Institute, in Philadelphia; Midwest Research Institute, in Kansas City; Southern Research Institute, in Birmingham; Southwest Research Institute, in San Antonio; Stanford Research Institute, in Palo Alto, and the Texas Research Foundation, near Dallas. These organizations cover all fields of industrial science, and conduct both applied and fundamental research for industry. Most are substantially endowed or otherwise capitalized, and for their services they charge actual out-of-pocket expenses, plus a percentage to cover overhead and equipment depreciation. Research is conducted in confidence and all results accrue to the company contracting for the work. In effect, then, these research institutes are the "private" laboratories of each of the thousands of companies they serve—providing confidential research at cost to the company, just as if the

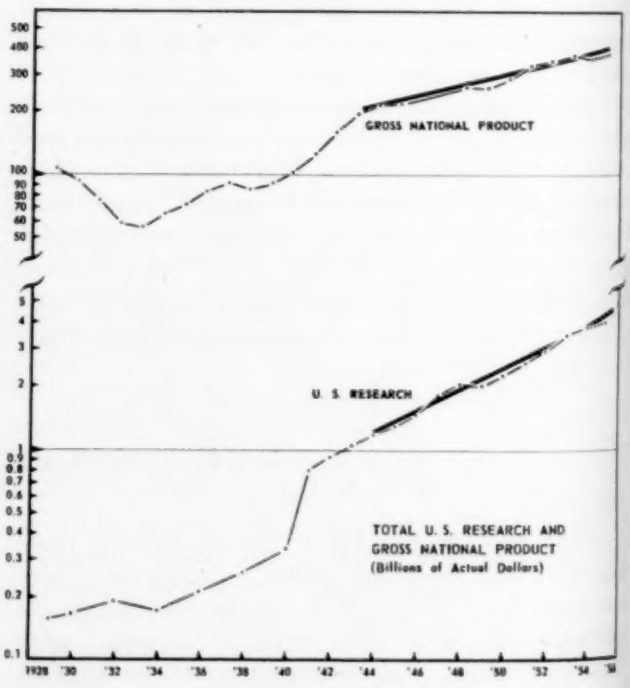


FIGURE 4

laboratory were a branch of the company. They serve both small and large companies alike, and, in addition, handle much of the contract research for governmental agencies.

Mellon is the oldest of the research institutes in point of service to industry, its organization antedating Franklin Institute's entry into industrial research by twelve years. Mellon is an outgrowth of a scheme of industrial fellowships introduced by Robert K. Duncan at the University of Kansas in the early years of this century. Duncan saw the need for training students in industrial research methods and also felt that industry at that time was hampered by lack of facilities for research. At the invitation of A. W. and R. B. Mellon, he came to the University of Pittsburgh in 1910 to establish a department of industrial research. Three years later Mellon Institute was endowed and organized as the first independent nonprofit research institute in the United States.

Mellon originated many of the contract research practices in use today and did much of the pioneering educational work on the value of industrial research. Specializing in chemistry, Mellon has given to the chemical industry many of its top executives, and thus has been responsible both directly and indirectly for chemical progress.

Battelle is the largest of the not-for-profit independent research institutes, with about 2500 staff members and a physical plant having a replacement value well in excess of $20 million. Its current volume of contract research is at the rate of $16 million annually. In a typical year, it supplies research services to 500 or more private companies, associations, or organizations. The total clientele of all the research institutes is nearly 3000 companies.

Research Foundations

The third type of research organization serving industry is the research foundation associated with a university. These foundations operate similarly to the independent research institutes, conducting research on a cost basis. Some have separate management and employ full-time permanent staffs. Others are responsible to the management of the university and use faculty members and graduate students either in part or exclusively for the execution of industrial projects. A few have their own laboratories, although the majority use customary university facilities.

Typical of these are the Alfred University Research Foundation, the Engineering Research Institute of the University of Michigan, the Purdue Research Foundation, the Division of Industrial Cooperation of the Massachusetts Institute of Technology, and The Ohio State Research Foundation. Some of these organizations conduct research running into millions of dollars per year. Together the university foundations add strongly to the nation's research might and industry's potential for progress. The services of these foundations are implemented further by the industrial research conducted in the graduate departments of universities, mainly as an educational function. Altogether, some 2800 universities and colleges provide research assistance in one way or another to industry.

Contract research, then, is the mechanism by which the requirements in men and equipment for modern team research are fulfilled for a large segment of industry. Contract research supplements the research conducted in company-owned laboratories—of which there are some 3000—in providing industrial progress. The growth of contract research, its evolution and development, and its extension to more and more industries is the most significant trend in respect to research facilities in America today.

Company-Owned Laboratories

I should point out that this does not lessen in any respect the work done by company-owned laboratories. But with the complexity of modern technology, fewer companies can afford adequate private research facilities. The biggest laboratories are still the laboratories of private corporations, such as those of American Telephone and Telegraph, Du Pont, General Electric, Standard Oil of New Jersey, Union Carbide and Carbon, American Cyanamid, Allied Chemical and Dye, Socony-Vacuum, and Monsanto. Du Pont spends about $61 million a year for research; American Telephone and Telegraph, nearly $24 million; Standard Oil of New Jersey, about $30 million; and Union Carbide and Carbon, around $35 million. The research budgets of the others named ran well in excess of $10 million. The Bell Telephone Laboratory has a staff of more than 6000 people and is thus 2½ times as large as Battelle, the largest contract research organization.

But, it is significant that as these "captive" laboratories grow and become more responsive to the needs of their companies, they too, diversify and tend to embrace more and more of the sciences and technologies—the better to use the cooperative or team research approach to the solution of problems. Thus the Du Pont laboratory employs metallurgists, mechanical engineers, and electrical engineers as well as chemists and chemical engineers; and the big metals

companies employ experts in many phases of science other than metallurgy.

There is a limit, of course, to how far it is wise for a company laboratory to diversify. Diversity to the extent of that of the research institutes would be impractical. But industrial laboratories can extend the range of their interests by using the services of research institutes. This they do, and large companies with expansive laboratories of their own are actually the major clients of organizations like Battelle, Armour, and Mellon.

To round out the picture of modern research facilities, we should mention trade association laboratories. There are some 2000 trade associations of national or regional scope in the United States and approximately 10,000 of state and local importance. At least 30 of these associations maintain their own laboratories. In these laboratories, the problems of general interest to the industries concerned are investigated. Trade association research is designed to promote an industry as a whole, rather than individual companies, and thus to place the industry in a better position among competitive industries.

The same problems of capitalization and maintenance of facilities apply to trade associations as to companies. For this reason, most associations use contract research rather than building and staffing their own laboratories. As new associations are formed for the purpose of research—frequently called research associations—or as older trade associations take up research as one of their functions, they usually look to contract research organizations for their laboratory work. This trend, as opposed to the older practice of setting up trade association laboratories, is enabling more rapid progress in the solution of industry-wide problems, and thus is accelerating industrial progress generally.

III. Productivity in Modern Research

"Productivity" is a word you hear bandied about in research laboratories today. Industry wants results, and wants results at the lowest possible cost. To achieve results quickly and economically, research must be highly productive. But can an intellectual activity be speeded up? Can it be systematized to the stage of a precise art?

Scientists would be hypocritical if they did not answer these questions in the affirmative. Science is used to make other activities precise and efficient. If the scientific approach can help production, sales, and other functions of business, it should also be helpful to research. Research on research procedure, then, is in order.

So it is that research administrators today are concerned with the application of science to the art of research. They are studying ways to make research more productive, more economical, and thus of greater use to industry. And remarkable progress is being made in this direction.

The team research plan, previously described, is, of course, the greatest accomplishment to date. But, aside from it, advances are being made. I shall not burden you with a great amount of detail, but I do wish to point out several things, mainly to establish in your minds that one of the trends in industrial research is an increasing productivity.

Obviously, one way to increase efficiency is to eliminate wasted effort and lost motion. Companies formerly boasted of the fact that only one in ten or one in fiifteen research projects paid off financially. This fact demonstrated their faith in research, their tenacity, and their patronage of science, but it hardly proved good judgment in research planning. The aim today is to eliminate, insofar as possible, the projects that don't pay off. This, of course, is very difficult, but by using mathematical techniques, coupled with expert judgment, wasted research effort can be reduced.

You may recall that during World War II, the science of operations research developed. It enabled the British to calculate the most effective fighter-plane dispersal patterns to stop German bombers. It also showed us how best to meet the submarine threat. Operations research is merely the mathematical analysis of a complex set of variables—the application of scientific techniques to what are normally looked upon as nonscientific problems. A business, like a military venture, is composed of a complex series of operations. The end goal in business is always a profit—just as the end goal in war is always military victory. Keeping this fact in mind, we can apply operations research techniques to industrial operations and determine the research *best calculated* to further the company's profits. If a company has X amount of money to spend on research, and if two research projects are being considered, operations research specialists can come

up with a formula showing the probable contribution of success in each project on the company's profits. Project No. 1 might have a probable Y effect on profits with the expenditure of X money, Project No. 2, however, might show the probability of a 50Y effect with the expenditure of X money. Obviously, if both have an equal chance of success from the technical standpoint, Project No. 2 is the one in which to invest money.

At Battelle, we call the application of operations research to industrial research planning "industrial operations diagnosis". We, in effect, diagnose the symptoms of illness, or lack of maximum health, in a company and then prescribe the research medicine best calculated to effect a remedy. Our clients are thus prevented from spending money on research that won't affect profits appreciably and are guided into projects with the best pay-off possibilities.

Methods of Increasing Productivity

You will note that even when you can forecast the projects most likely to affect the profit status favorably, there is still the problem of judgment of technical feasibility. The team research approach, with senior research people from various fields of technology sitting in on planning conferences, fairly well takes care of this.

Contract research, in itself, tends to sharpen up research planning. A contract research laboratory cannot afford too many failures. Thus, before an organization like Battelle signs a contract to conduct a research investigation, it ascertains very carefully the probability of success. If that probability is slight, Battelle lets the sponsoring company know this fact so it will not be disappointed later on.

Other things are done to increase research productivity. Incentive plans are frequently used in industrial laboratories to get the most from research scientists. All modern laboratories relieve their scientists and engineers from routine tasks by providing them with adequate technical, clerical, stenographic, and secretarial assistance. Good equipment, good working conditions, a high type of leadership, chances for advancement, and professional recognition—these contribute to research productivity.

Research administrators in recent years have been exchanging experience and consulting with psychologists and experts in the fine arts to see what might be done about breaking down another barrier to greater efficiency and productivity. Research, like music, writing, and painting is a creative activity. Creativity is a capacity that everyone has to some degree, although few of us ever utilize more than a small fraction of our latent abilities. It is doubtful, in fact, if the average man—even the working scientist and engineer—uses more than ten per cent of his latent creativity. This being the case, how much more productive our laboratories would be if we could but awaken another five or ten per cent of creative capacity!

Psychologists do not regard such a possibility as unattainable, and research leaders are now looking for methods for increasing the creativity of their staffs. Three years ago the Industrial Research Institute spent two days discussing the problem. At Battelle we are letting our people know that we appreciate creative thinking and that their ideas will always be given sympathetic audience. We encourage informal group meetings merely for letting imaginations run wild. We let our people know that the creativity exhibited is taken into account when salary increases are considered. A committee, set up for the purpose, is studying additional means by which this vital quality may be nourished. Whether or not we at Battelle, or the management of other laboratories, are successful in stepping up the creativity of our staffs, we, by the very process of trying, should improve research productivity.

IV. The Tempo of Research and Its Application

With more money being spent on research, and with its teamwork methods and increased efficiency and productivity, research is naturally proceeding at a faster pace. As I noted previously, our laboratories now accomplish in a few months what formerly took years. You will recall the example of the research conducted by Battelle on drill-pipe breakage. You will also note the speed with which our scientists developed the hydrogen bomb, after the uranium A-bomb was an accomplished fact. And you will remember that colored television—a very complex development—quickly followed black-and-white television.

This increased pace of progress is extremely important to industry. It makes possible the mushrooming industrial growth that we have experienced in recent years. An analysis of the 1953 production of 34

American companies, which was presented in *Barron's National Business and Financial Weekly,* points this fact up nicely. For instance, the Johns-Manville Corporation found that 47 per cent of its sales in 1953 represented new or radically improved products that had been introduced since 1940. The Monsanto Chemical Company reported that 40 per cent of its profits in 1953 came from products it did not manufacture 10 years earlier. Charles Pfizer and Company introduced a total of 78 new or radically improved products in that year. In 1953, also, the International Harvester Company put more new products on the market than in any previous year in its history. The electronics industry as a whole made net sales of $8 billion in 1953, compared with sales of $500 million in 1940. Petrochemicals, largely developed through research since 1940, reached an output of $3 billion.

Many of the developments making possible rapid industrial expansions are less than five years from the idea conception stage. Some are but a year or two from the laboratory. When you consider that 15 or 20 years were formerly required for a technological idea to materialize into a marketable product, you appreciate the economic significance of the increased tempo of research and its application. This steady stream of rapidly appearing new products furnishes a continuing demand for new capital and thus creates continuing investment opportunities. The Monsanto Chemical Company estimates that it eventually must invest six dollars in new plant and equipment for every dollar it spends on research. If this ratio applies to research as a whole, the $3.75 to $4 billion now being spent annually on research would point to the need for capital expenditure of the order of $20 billion annually a few years from now just to take care of the new products that will be coming on the market.

In fairness, I should emphasize that the present rapid appearance of new products is due to a higher rate of application of research results in industry, as well as to the faster execution of laboratory work. Our industries, being technologically minded and constituted, can apply research results much faster than they could a few decades ago. Industrial management has developed to a degree comparable to the development of industrial research.

Attitudes Toward Research

Still another trend is aiding and abetting industrial progress. This is the rapidly developing public recognition of the value of science and the research function.

The advertising profession, writers on scientific subjects, the spokesmen of industry, and others have done a good job of selling science to the general public. As a result, the public is becoming attuned emotionally and intellectually to the age in which we live and is developing increased faith in science and research, working through our own free enterprise system, to solve problems and provide a better life. You may recall that this was not true when most of us were youngsters. Then, the electric light was regarded with suspicion, and the early automobiles were subjects of public derision. Even such simple innovations as aluminum cooking ware had a hard time making the grade; the new metal would certainly poison her family, the housewife thought, and she had little faith in the aluminum industry's assurances to the contrary.

In contrast, according to one planetarium, if science should announce tomorrow plans for sending a manned space ship to the moon, it could furnish a list of 25,000 names of people who would be willing to make the trip. This is carrying faith to the extreme, but somewhat the same fervor prevails when a new drug is invented, a new household electric appliance is introduced, or something as revolutionary as atomic power comes along.

Manufacturers of consumer goods feel intensely this public acceptance of research and progress. It assures that sound ventures into new areas of manufacturing will meet with success. If you build a better mousetrap, the public may not beat a path to your door, but it will beat many paths to the doors of your distributors. This public acceptance of new products is the best insurance of all for the security of capital investments.

Manufacturers feel this new and growing public recognition of science and research in still another way. Public appreciation of new and improved things is turning into a public demand and clamor for such things. This puts companies on their toes. A consuming public hears about some new scientific principle or development and immediately agitates for its application to products. The manufacturer is put on his mettle to satisfy the public's hunger for technological innovations. His only refuge is in more intensified research—and so a beneficial "vicious circle" is set in motion.

Nothing, I believe, has created respect and understanding for our free enterprise system as has modern research and technology. Research supplied the one thing that was lacking in capitalism, namely an inexhaustible frontier on which capitalism can feed. We may always have ups and downs in our economy—adjustments to change—but I am firmly convinced that our path from now on will never again be too rocky or too thorny.

Notes From Battelle

JOINT SPONSORSHIP OF RESEARCH

JOINT SPONSORSHIP OF industrial research by two or more companies to solve common problems can better their competitive position in an economical and efficient manner, according to David C. Minton, vice president at Battelle. Speaking at the annual meeting of the Non-Ferrous Founders' Society in Chicago, Minton said that more companies are now banding together to solve a wide variety of problems. Group research is being done to improve products, reduce costs, develop new products, reduce waste, and utilize scrap and by-products.

Today, groups are spending 20 million dollars annually on research—twice as much as ten years ago. Manufacturers are the principal underwriters of such programs. Groups may range from two companies banded together on a common problem to industry-wide associations. "Research associations" or groups of companies representing fairly large segments of their industry, organized for the sole purpose of research, are becoming increasingly popular.

Minton pointed out that about 500 of the 12,000 trade associations in the United States now engage in some form of research. In addition, about 75 of the 500 professional and technical societies in the physical, biological, and engineering fields are supporting research programs. Methods of financing group research, he said, range from voluntary contribution to specific assessment of group members.

FREE-FLOWING ROSIN

VARIOUS FORMS OF rosin, products of the naval stores industry, are used in rubber compounding, varnishes, paper sizing, and many kinds of pressure-sensitive adhesive tapes. Rosin usually is shipped in steel drums as a solidified mass which must be chopped into small pieces for use.

A new, free-flowing form of stabilized rosin, which, promises greater ease of handling, has been developed at Battelle. This rosin composition remains free-flowing because it has been pelletized and treated with a special conditioner. It can be shipped in paper bags or fibre drums, as well as steel drums, and can be poured from the container. The pellets will not fuse at temperatures up to 130 F; neither will they cake under pressure when bags of the material are stacked for storage. The composition, based on an iodine-disproportionated rosin, is also stabilized against deterioration through oxidation.

The new form of modified, free-flowing rosin will be produced by the G and A Laboratories, Inc., Savannah, Georgia, who sponsored the research at Battelle.

RESIDUAL METALS IN BASIC STEEL

REGULAR REPORTS ON the amounts of adventitious residual metals to be found in American basic open-hearth steel, except for a single report for 1944, have not been available since 1938. Because of the continued great interest in the subject, however, John D. Sullivan, Battelle technical director, prepared a paper on "Residual Metals in Open-Hearth Steel, 1954" for presentation before the National Open Hearth Conference at Philadelphia in April, 1955.

Data for the paper were secured from 14 steel plants scattered throughout the United States and Canada. These plants represent well over 50 per cent of the United States' open-hearth steel. The companies supplied reports of analyses made in their own laboratories. Previous studies had been based on analyses made in a single laboratory, first at the Bureau of Mines in Pittsburgh, and from 1931 on, at Battelle. Because of this difference and the fact that not the same plants were represented in the 1954 report as in the previous reports, Mr. Sullivan suggested that comparisons must be made cautiously.

The 1954 analyses apparently showed that copper is 0.014 per cent higher and nickel 0.022 per cent lower than in 1944. Residual nickel was unusually high in 1944. There also appeared to be slight increases in chromium and tin and a slight decrease in molybdenum. Comparisons between the reports for 1930 and 1954 with respect to copper, nickel, chromium, and

tin showed for 1930—0.103, 0.055, 0.033, and 0.007 per cent respectively, and for 1954—0.122, 0.062, 0.48, and 0.016. The relatively insignificant increases over more than two decades were less than steel men once feared they would be. Mr. Sullivan suggests that the great care of the steel companies in selecting scrap probably has held down the amount of residual metals entering the steel.

FAST ATMOSPHERIC ANALYSIS

A NEW METHOD FOR identifying minute concentrations of impurities in the air has been developed by Battelle scientists. The method involves "longpath" infrared spectrophotometry and has the advantage of being extremely sensitive and accurate. It is expected to be useful in air-pollution control studies and in the monitoring of industrial plant atmospheres.

The Battelle procedure for detection and analysis of air contaminants is based on the principle that specific substances in the air absorb certain wavelengths of light. Light is absorbed in proportion to the amount of the impurity in the air. By projecting a beam of infrared light through a 175-foot gap of air and measuring the type and amounts of light absorbed, small concentrations of impurities can be analyzed both qualitatively and quantitatively. This procedure has been described in a preliminary Battelle report written by James Tighe, Richard Engdahl, and John Center.

Another advantage of the infrared method is its rapidity. Usually, long periods are required to collect air samples for chemical analysis. The Battelle process detects and identifies impurities in the air directly and instantaneously. Serious attempts to control air pollution have, until now, been handicapped at times for lack of quick, accurate methods for identifying the contaminating substances to be found in various localities.

GRAPHIC ARTS RESEARCH

IN A RECENT REPORT to the Research and Engineering Council of the Graphic Arts Industry, Battelle listed some of its pertinent research investigations of the past year. Included were:

- Development of a rapid drying black ink for the Engraved Stationery Manufacturers' Research Institute, Inc., which will help to eliminate the necessity for drying printed sheets on racks. Colored inks are being investigated.
- A study of methods for simplifying the etching operation to permit better control of this step and a study of the mechanism by which the etching solution penetrates the carbon tissue, for Gravure Research, Inc.
- Improvements in the processing of vinylite molds, particularly related to joining of the molds, for Printing Plates Research, Inc.
- Development of xerographic methods for preparing spirit-duplicating masters—the first successful application of photography to this use—for the Haloid Company. Prototype apparatus is being field tested.
- Completion of laboratory work on the preparation of full-size metal lithographic plates by xerography for printing topographic maps. Such plates can be prepared in the laboratory in about ten minutes. The equipment is now being tested by the Engineer Research and Development Laboratories. Studies have been started on the development of methods for preparing lithographic plates by xerography for printing photomaps.
- Reversal development for obtaining positive xerographs from negative photographic transparencies. Successful in the laboratory, the process makes xerography potentially useful as a photofinishing process. The project is sponsored by the U. S. Army Signal Corps.

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David M. Edwards, management specialist with more than 15 years of diversified industrial experience, has been appointed to head Battelle's industrial management studies. The appointment was made to facilitate the Institute's expanding program in management services, which under the general direction of Dr. Richard J. Lund, have grown in recent years to utilize a staff of 175 people.

In his new position, Edwards will join William L. Swager, David D. Moore, and Iver Igelsrud in guiding Battelle's research and advisory work in the field of management services. Swager heads the activities in management research; Moore is in charge of studies in industrial economics; Igelsrud has responsibility for the Institute's technological information services. Edwards, in addition to supervising industrial management studies, will continue to act as a consultant to the over-all program.

Writings by Staff Members*

Wrought Carbon and Alloy Steel: Machinability. Francis W. Boulger. *Machine Design*, May, 1955, pp. 162-166.

Presents general information on the cutting quality of common constructional steels. The effects of composition, microstructure, and machining conditions on tool life are discussed qualitatively.

Properties and Uses of Radioisotopes. G. D. Calkins. Paper from Symposium on Radioactivity—An Introduction. American Society for Testing Materials *Special Technical Publication No. 159*, pp. 3-8, 1954.

Discusses the processes of radioactive decay and of the absorption of radiation. It explains applications of radioactive materials as isotopic tracers and sources of radiation.

Results of Some Marine-Atmosphere Corrosion Tests on Magnesium-Lithium Alloys. P. D. Frost, F. W. Fink, H. A. Pray, and J. H. Jackson. *Electrochemical Society, Journal*, May 1955, pp. 215-218.

Reports on exposure tests of ultralight high-strength alloys for structural application. One experimental alloy containing about 9 per cent lithium had almost as good corrosion resistance as a commercial magnesium-aluminum-zinc alloy.

Battelle Mud Study VI: Chip Clearance Depends on Fluid Properties, Design of Bit Hydraulics. Donald Gideon and Ralph Simon. *The Drilling Contractor*, April, 1955, pp. 63-64.

The effect of drilling-fluid velocity, kinematic viscosity, gel strength, and bit hydraulics upon chip-clearance times are described on the basis of experiments performed using a model of a hole bottom.

A Study of Spreader-Stoker Reinjection Systems. W. C. Holton. American Society of Mechanical Engineers *Paper No. 54-A-117*, 1955, 14 pp.

Describes the results of spreader-stoker tests in an attempt to determine the efficiency of these units in burning fly ash reinjected into the boiler furnaces. All of the combustible material in the fly ash can be burned after reinjection, and a portion of the noncombustible material in the fly ash is deposited on the grate.

Research Gating Data Finds Practical Use. J. G. Kura. *Foundry*, May, 1955, pp. 108-109.

As a result of research conducted on gating systems, tested principles are available to foundrymen. Describes some of the principles of good gating practice for producing high-quality castings.

**Members of the Battelle staff are authors of the recently published articles and books listed on this page. In most cases, reprints are available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.*

An Analysis of the Stability of Carbon Monoxide-Hydrocarbon-Air Flames. Arthur Levy and Philip F. Kurz. *American Chemical Society, Journal*, March 20, 1955, pp. 1459-1461.

Carbon monoxide-hydrocarbon fuel mixtures are unique in that the mixtures exhibit flame stabilities which are greater than the flame stability of either of the individual fuel components. This anomaly has been explained in terms of the preflame reaction kinetics of hydrocarbons and of carbon monoxide-water vapor mixtures.

Suppression of Burner Oscillations by Acoustical Dampers. A. A. Putnam and W. R. Dennis. American Society of Mechanical Engineers *Preprint No. 54-A-174*, 1955, 10 pp.

Presents experimental results on the effectiveness of tuned quarter-wave tubes, tuned Helmholtz resonators, orifices, and exit reflectors in damping burner oscillations.

Preparation and Arc Melting of High-Purity Iron. G. W. P. Rengstorff and H. B. Goodwin. *Journal of Metals, American Institute of Mining and Metallurgical Engineers, Transactions*, March, 1955, pp. 467-471.

Describes the method used to prepare high-purity iron, for research, in batches of 150 pounds. Oxygen, carbon, nitrogen, and sulfur are removed from flakes of electrolytic iron by treatment in wet and then dry hydrogen. The purified flakes are melted into ingots with a special consumable-electrode arc furnace.

A Microscope Hot Stage. H. A. Saller, R. F. Dickerson, and R. J. Carlson. *Metal Progress*, May, 1955, pp. 105-108.

A compact unit for studying structural changes in metals at temperatures up to 1800 F. Description covers vacuum furnace, optical group, cold trap, and vacuum system.

Research, the Key to Future Markets for Drying Oils. Odin Wilhelmy, Jr. and Harry W. Barr, Jr. *The Journal of the American Oil Chemists' Society*, April, 1955, pp. 204-207.

Highlights of a nationwide survey of recent developments and future outlook in the drying-oils industry. Study suggests several avenues of research most likely to improve the competitive position of drying oils and counteract the declining trend in their consumption.

The Collection of Silica Fumes With a Venturi Scrubber. J. E. Yocom and S. Chapman. *Air Repair*, November, 1954, pp. 155-158.

Describes field experiments using a pilot-scale Venturi scrubber to collect silica fume from a ferrosilicon electric furnace. High pressure drops in the Venturi were required to obtain high fume collection efficiencies which would result in high operating costs for a commercial-scale unit.

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***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

9845 Current Progress in Guided Weapons. *Aeroplane*, v. 88, May 20, 1955, p. 661-667.

Guidance and homing systems. Missiles of the U.S.A.F. Tables, photographs.

9846 Maximum Range of a Projectile in a Vacuum. Clyde D. Baker and Judson J. Hart. *American Journal of Physics*, v. 23, May 1955, p. 253-255.

A formula for the angle which produces maximum range on a spherical, non-rotating earth is derived. Initial velocities and altitudes are assumed to be such that the projectile returns to the earth. Diagram. 1 ref.

9847* Astronautical Activities in Germany. H. H. Koelle. *British Interplanetary Society, Journal*, v. 14, May-June 1955, p. 121-132.

History; future development. Photographs.

9848* Extra-Terrestrial Observatories—Their Purpose and Location. C. A. Cross. *British Interplanetary Society, Journal*, v. 14, May-June 1955, p. 137-143.

Includes tables, graph. 11 ref.

9849 Increasing the Speed Range of Aircraft. *Engineering*, v. 179, May 20, 1955, p. 631-632.

Boundary-layer control by sucking and blowing; jet lift. Photographs, diagram.

9850 Laminar-Diffusion Boundary Layer—A Review. Kurt Berman. *Journal of Applied Mechanics*, v. 22, June 1955, p. 197-203.

Mass-transport phenomena and their nondimensional correlation are summarized. In order that similarities between energy, momentum, and mass-transport phenomena may be exhibited, the discussion of diffusion is preceded by brief summaries of dynamic and temperature boundary-layer theories. Graph. 22 ref.

9851* Theory of the Wing of Small Extension. **K teorii kryla malogo udlineniia.** (Russian.) V. V. Golubev. *Prikladnaia Matematika i Mekhanika*, v. 19, no. 2, Mar.-Apr. 1955, p. 143-158.

Analysis of design parameters; flow studies. Diagrams.

9852 The Outlook on Airframe Fatigue. Walter Tye. *Royal Aeronautical Society, Journal*, v. 59, May 1955, p. 339-348.

Safe life of spars; wing tests; pressure cabin testing; tail planes; present situation and immediate future. Graphs, photographs. 10 ref.

9853 Recent Developments in the Hydrodynamic Design of Flying-Boats. J. H. Paterson. *Royal Aeronautical Society, Journal*, v. 59, May 1955, p. 349-355.

Includes graphs, photographs.

9854 Theoretical and Experimental Investigation of Additive Drag. Merwin Sibulkin. *U. S. National Advisory Committee for Aeronautics, Report* 1187, 1954, 12 p. (TL521 Un3r)

Apparatus and procedure; comparison of theory and experiment; calculation of additive drag from schlieren photographs. Graphs, diagrams.

9855 A Method of Quadrature for Calculation of the Laminar and Turbulent Boundary Layer in Case of Plane and Rotationally Symmetrical Flow. E. Truckenbrodt. *U. S. National Advisory Committee for Aeronautics, Technical Memorandum* 1379, May 1955, 40 p. (TL570 Un3tm)

Includes diagram, graphs, tables. 19 ref.

9856 A Technique Utilizing Rocket-Propelled Test Vehicles for the Measurement of the Damping in Roll of Sting-Mounted Models and Some Initial Results for Delta and Unswept Tapered Wings. William M. Bland, Jr. and Carl A. Sandahl. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3314, May 1955, 25 p. (TL570 Un3t).

Includes table, diagrams, photographs, graphs. 7 ref.

9857 A Dynamic-Model Study of the Effect of Added Weights and Other Structural Variations on the Blade Bending Strains of an Experimental Two-Blade Jet-Driven Helicopter in Hovering and Forward Flight. John Locke McCarty and George W. Brooks. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3367, May 1955, 47 p. (TL570 Un3t)

Apparatus and test procedure; method of analysis and presentation; results. Graphs, diagrams, tables, photograph. 3 ref.

9858 Heat-Loss Characteristics of Hot-Wire Anemometers at Various Densities in Transonic and Supersonic Flow. W. G. Spangenberg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3381, May 1955, 82 p. (TL570 Un3t)

Experimental investigation. Graphs, diagrams, micrographs, tables. 9 ref.

9859 Low-Speed Investigation of the Effects of Angle of Attack on the Pressure Recovery of a Circular Nose Inlet With Several Lip Shapes. James R. Blackaby. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3394, May 1955, 30 p. (TL570 Un3t)

Model; tests; results. Graphs, diagrams, photograph. 1 ref.

9860 Some Calculations of the Lateral Response of Two Airplanes to Atmospheric Turbulence With Relation to the Lateral Snaking Problem. John D. Bird. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3425, May 1955, 24 p. (TL570 Un3t)

Calculation methods; results. Graphs, diagrams, tables. 6 ref.

9861 Theoretical Investigation of a Proportional-Plus-Flicker Automatic Pilot. Ernest C. Seaberg. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3427, May 1955, 53 p. (TL570 Un3t)

Airframe and auto pilot principles and description; methods of analysis; results. Graphs, diagrams, tables, photograph. 4 ref.

9862 On the Kernel Function of the Integral Equation Relating Lift and Downwash Distributions of Oscillating Wings in Supersonic Flow. Charles E. Watkins and Julian H. Berman. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3438, May 1955, 43 p. (TL570 Un3t)

Includes diagrams. 19 ref.

Aeronuatical Engineering

9863 Hovering Flight Tests of a Four-Engine-Transport Vertical Take-Off Airplane Model Utilizing a Large Flap and Extensible Vanes for Redirecting the Propeller Slipstream. Louis P. Tosti and Edwin E. Davenport. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3440, May 1955, 26 p. (TL570 Un3t)

Includes graphs, diagrams, photographs, table. 4 ref.

9864 An NACA Vane-Type Angle-of-Attack Indicator for Use at Subsonic and Supersonic Speeds. Jesse L. Mitchell and Robert F. Peck. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3441, May 1955, 8 p.

Includes diagram, photograph, graphs. 2 ref.

9865 A Preliminary Investigation of Aerodynamic Characteristics of Small Inclined Air Outlets at Transonic Mach Numbers. Paul E. Dewey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3442, May 1955, 21 p. (TL570 Un3t)

Data show the discharge coefficient of such outlets and the static-pressure distribution in the vicinity of the outlets for several values of stream Mach number and discharge flow parameter. Photographs, graphs, diagrams. 1 ref.

9866 Flight Testing by Radio Remote Control—Flight Evaluation of a Beep-Control System. Howard L. Turner, John S. White, and Rudolph D. Van Dyke, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3496, Mar. 1955, 55 p. (TL570 Un3t)

Comparison made between the handling-quality flight-test data obtained by remote control and results of similar tests performed manually. Selection of the autopilot parameters are discussed. Graphs, diagrams, photographs, table. 10 ref.

See also:

9928 (ceramic radomes for aircraft)
10406 (aircraft springs)
10921 (plastics in aircraft)

AGRICULTURE

9867 Effect of Borate Additives on Herbicides. J. D. Stone and D. W. Rake. *Agricultural Chemicals*, v. 10, May 1955, p. 36-38, 123, 125.

Control of microorganic activity in the soil. Photographs, graphs, table. 3 ref.

9868 Pesticide Residue Tolerances. Charles Palm. *Agricultural Chemicals*, v. 10, May 1955, p. 49, 109.

Program for safe use outlined.

9869* Report on Neutralizing Value of Limestone. W. M. Shaw, Brooks Robinson, and W. H. MacIntire. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 240-245.

Determination of $CaCO_3$ equivalence of limestone and dolomite through potentiometric titration to *p*H 7. Tables, graph, photograph. 3 ref.

9870* Studies of Soil Manganese. I. The Use of Disodium Calcium Versenate for the Extraction of Divalent Manganese From Soils. R. S. Beckwith. *Australian Journal of Agricultural Research*, v. 6, Mar. 1955, p. 299-307.

Extractant has been found of value for the removal of divalent Mn formed by treatment of soils with reducing agents. Tables, graphs. 16 ref.

9871* The Production of Sugar Beets on Organic Soils. J. F. Davis. *Better Crops With Plant Food*, v. 39, May 1955, p. 6-10, 47-48.

Includes tables, graphs, photographs. 6 ref.

9872* What Is Happening to Our Citrus Soils? H. D. Chapman and R. B. Harding. *Better Crops With Plant Food*, v. 39, May 1955, p. 11-14, 40-44.

Depletion of nutrient minerals and increase in salinity of Calif. soils. Tables, photographs. 23 ref.

9873* Disinfestation of Soil by Heat, Flooding and Fumigation. A. G. Newhall. *Botanical Review*, v. 21, Apr. 1955, p. 189-250.

Discussion of flooding, materials, and methods involving heat and volatile chemicals which disinfest soils. 385 ref.

9874* Canada's Apple Industry. O. R. Evans. *British Agricultural Bulletin*, v. 8, May 1955, p. 41-45.

Export; growing districts; varieties; pests and diseases. Photographs.

9875* English Cheeses. C. S. Smith. *British Agricultural Bulletin*, v. 8, May 1955, p. 51-55.

Production and markets; creamery manufacture. Map, photographs.

9876 The Relative Insecticidal Activity, Synergism and Practical Use of Allethrin Compared With Pyrethrins. K. F. Goodwin-Bailey. *Chemistry & Industry*. 1955, no. 19, May 7, p. 514-520.

Pyrethrins are to be preferred, especially in the present market. Table, graphs. 15 ref.

9877 California Farming. Rich Soils and Golden Harvest. *Crops & Soils*, v. 7, June-July 1955, p. 16-21.

Many interesting and unusual features of agriculture in Calif. Photographs.

9878 Atomic Energy. New Tool for Plant Breeders. W. Ralph Singleton. *Crops & Soils*, v. 7, June-July 1955, p. 22-23.

Progress in accumulating a reserve of new parent material for breeding new varieties. Photographs.

9879* Experiments in the Increase of Frost Resistance in Stock and Cabbage Under the Influence of Extracts From Frost-Resistant Plants. **Opyty po povysheniiu morozostoikosti levkoia i kapusty pod vliianiem ekstraktov iz zimostoikikh rastenii.** (Russian.) I. N. Konovalov. *Doklady Akademii Nauk SSSR*, v. 101, no. 4, Apr. 1, 1955, p. 767-770.

Carbohydrate content and oxidation-reduction activity in plants from seed treated with extract from badan plants. Photographs, tables. 11 ref.

9880* Effect of Bacteria on the Assimilation of Organic Substances by Plants. **Vliianie bakterii na usvoenie rasteniami organicheskikh veshchestv.** (Russian.) N. A. Krasil'nikov and A. P. Bezzubenkova. *Doklady Akademii Nauk SSSR*, v. 101, no. 6, Apr. 21, 1955, p. 1127-1130.

Rate of assimilation of streptomycin or penicillin in relation to type or mixture of stimulating bacteria. Tables, micrograph, graphs. 2 ref.

9881* The Control of Annual Grasses in California Cotton With Dalapon. A. W. Swezey and J. R. Fisher. *Down to Earth*, v. 11, no. 1, Summer 1955, p. 2-5.

Includes photographs, tables. 5 ref.

9882* New Horizons in the Application of Chelation of Agriculture. E. J. Haertl. *Down to Earth*, v. 11, no. 1, Summer 1955, p. 6-9.

Use of metal chelate compounds in plant nutrition. Photographs. 16 ref.

9883* Preservative for Harvesting Containers. Milton Goll and Chester D. Thompson. *Farm Chemicals*, v. 118, May 1955, p. 26-27, 29.

Cellu-San, a Zn petroleum sulfonate product, is shown to be an effective and practical preservative-fungicide for protection from moisture and fungi. Photograph, table.

9884* Effects of Insecticides on Phytotoxicity and Off-Flavor. J. G. Watts. *Farm Chemicals*, v. 118, May 1955, p. 47 + 4 pages.

Odor and flavor contamination in crops by insecticidal chemicals. 49 ref.

9885* Liquid Fertilizers. Chester Charles. *Farm Quarterly*, v. 10, Summer 1955, p. 44 + 7 pages.

With the new equipment to handle liquid fertilizer, a farmer gets higher speed, lower costs, and no lifting. Photographs.

9886 The Value of Certain Agricultural, Marine and Industrial Products and By-Products in Livestock Feeding. I. John Duckworth. *Journal of the Science of Food and Agriculture*, v. 6, Apr. 1955, p. 177-185.

Includes tables. 39 ref.

9887 Denigès' Method for Determination of Phosphate, With Special Reference to Soil Solutions and Extracts. S. H. Yuen and A. G. Pollard. *Journal of the Science of Food and Agriculture*, v. 6, Apr. 1955, p. 223-229.

Includes tables. 20 ref.

9888 The Fate of Labelled Insecticide Residues in Food Products. II. The Nature of Methyl Bromide Residues in Fumigated Wheat. III. *N*-Methylation as a Result of Fumigating Wheat With Methyl Bromide. IV. The Possible Toxicological and Nutritional Significance of Fumigating Wheat With Methyl Bromide. F. P. W. Winteringham, A. Harrison, R. G., Bridges and Patricia M. Bridges. *Journal of the Science of Food and Agriculture*, v. 6, May 1955, p. 251-274.

Includes diagrams, tables, graphs. 93 ref.

9889* Effectiveness of Chemical Means of Weed Control. **Effektivnost' khimicheskikh sredstv bor'by s sorniakami.** (Russian.) L. I. Korolev and Ia. Iu. Starosel'skii. *Khimicheskaia Promyshlennost'*, 1955, no. 1, Jan.-Feb., p. 15-18.

Studies on 2,4-D, 2M-4Kh (sodium salt of 2-methyl-4-chlorphenoxyacetic acid), DNOK (dinitroorthocresol), DNFNa (sodium dinitrophenolate), "DNFA" (ammonium dinitrophenolate), "IFK" (isopropyl phenyl carbamate), "TATs" (sodium trichloracetate), "DKM" (dichloral-urea), etc. Tables.

9890* The Measurement of Insect Density in the Air. I. C. G. Johnson and L. R. Taylor. *Laboratory Practice*, v. 4, May 1955, p. 187-192.

Sampling of small insects from the air and particularly with suction traps, for the study of the dispersal of pests, especially aphids. Graph, photographs. 27 ref. (To be continued.)

9891* Dinitro-Ortho-Cresol, a Plant Protection Agent of Many Uses. **Egy sokoldalú növényvédőszer; a dinitroortokrezol.** (Hungarian.) Imre Lőrinc and Viktor Andriska. *Magyar Kémikusok Lapja*, v. 10, no. 3, Mar. 1955, p. 81-83.

Production and application as a spray for fruit trees and killing weeds in grain. 5 ref.

9892* Rapid Method of Determining the Gross Content of Siliceous Acid in the Soil. **Uskorennyi metod opredeleniia valovogo soderzhaniia kremnevoi kisloty v pochve.** (Russian.) E. V. Arinushkina and T. P. Boltenko. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk*, v. 10, no. 3, Mar. 1955, p. 105-113.

Includes tables. 13 ref.

9893 Returns and Costs With Fertilizer. Donald B. Ibach. *Plant Food Journal*, v. 9, Jan.-Feb.-Mar. 1955, p. 6-7, 16.

Includes tables, graphs.

9894* The Spread of Soil Erosion and Its Prevention in Regions Where Virgin and Long-Unused Soils Are Being Put Into Use. **Rasprostranenie erozii pochv i preduprezhdenie ee v raionakh osvoeniia tselinnykh i zalezhnykh zemel'.** (Russian.) S. S. Sobolev and I. F. Sadovnikov. *Pochvovedenie*, 1955, no. 1, Jan., p. 16-24 + 4 plates.

Types of plowing, fallow strips, trenching, other measures against washout and wind. Use of forest and grass belts. Map.

9895* A Mode of Vegetative Propagation in Black Spruce. Joseph-Henri LeBlanc. *Pulp and Paper Magazine of Canada*, v. 56, May 1955, p. 146-148, 151, 153.

Occurence of rooting; description of rooting system; hints in determination of probable origin of reproduction; value of a rooting as a mature tree. Photographs, diagrams.

9896* Additivity of X-Rays and Ultraviolet Light in the Inactivation of Haploid and Diploid Yeast. Robert B. Uretz. *Radiation Research*, v. 2, May 1955, p. 240-252.

An attempt to obtain several different dose-effect curves under conditions which would warrant a strong interrelationship among the assumptions in terms of formal target theory necessary to describe each curve. Graphs. 12 ref.

9897 Antibiotics Against Plant Diseases. David Pramer. *Scientific American*, v. 192, June 1955, p. 82-88, 90.

A popular account of current studies. Graphs, diagrams. 3 ref.

9898* Theoretical Aspects of the Soil-Conditioning Activity of Polymers. R. S. Montgomery and B. B. Hibbard. *Soil Science*, v. 79, Apr. 1955, p. 283-292.

Correlation of polymer structures with their soil-conditioning activity as measured by the ability to form stable aggregates and increase the percolation of water through the soil. Graphs. 10 ref.

9899 Uptake and Degradation of Labelled Systemic Insecticides. II. Treatment of Tobacco and Potatoes With *Systox*. III. Estimation of the More Toxic Degradation Products of *Systox*. L. H. Stein and A. J. Smith. *South African Chemical Institute, Journal*, new ser., v. 7, no. 2, Sept. 1954, p. 114-124.

Evaluation of insecticide concentration at different times after application; toxic degradation products in plant matter. Tables. 7 ref.

9900 Fertiliser Studies With Tobacco Plants Using Radiophosphorus-Labelled Superphosphate. IV. L. H. Stein and H. L. Pearse. *South African Chemical Institute, Journal*, new ser., v. 7, no. 2, Sept. 1954, p. 125-130.

Chemical and radiometric analysis; results. Tables. 6 ref.

9901* Control of Aquatic Weeds That Impede Flow of Western Irrigation Waters. Eugene T. Oborn. *Weeds*, v. 3, no. 3, July 1954, p. 231-240.

Control of submersed waterweeds and of emergent aquatic weeds; tolerance of crops to herbicides in irrigation water; herbicidal action using radioactive 2,4-D-1C^{14}; biological corrosion of concrete. Tables. 19 ref.

9902* Some Chemical and Physical Properties of Weed Killers. R. W. Nex and A. W. Swezey. *Weeds*, v. 3, no. 3, July 1954, p. 241-253.

Includes tables. 25 ref.

9903* Fate and Activity of Herbicides in Soils. R. E. Ogle and G. F. Warren. *Weeds*, v. 3, no. 3, July 1954, p. 257-273.

Temperature breakdown studies; movement of herbicides; NPA retention studies. Tables, graphs. 27 ref.

9904 Maleic Hydrazide as a Plant-Growth Inhibitor. E. R. Webber. *World Crops*, v. 7, May 1955, p. 179-183.

Review of work on application of chemical for weed control. Photographs. 15 ref.

9905 Agriculture in the Soviet Union. I. W. G. Cass. *World Crops*, v. 7, May 1955, p. 198-200.

An account of 1954 Moscow exhibition. Report of present standing of the Williams' theory of crop rotation in Russia today. Photographs.

9906 The Evolution of Tillage Implements. I. Norman L. Goodland. *World Crops*, v. 7, May 1955, p. 201-206.

Traces evolution of the art and implements used, from Neolithic age to 19th century. Photographs.

9907* Treatment of Flax Seed With Copper Sulfate. **Obrabotka semian l'na mednym kuporosom.** (Russian.) N. A. Drozdov and Iu. N. Shcherbakov. *Zemledelie*, v. 3, no. 4, Apr. 1955, p. 46-47.

Results in terms of fiber length and yield.

9908* Effectiveness of Specific Varieties of Azotobacter. **Effektivnost' spetsifichnykh raznovidnostei azotobaktera.** (Russian.) O. Ia. Gaak and I. P. Pshenichnyi. *Zemledelie*, v. 3, no. 4, Apr. 1955, p. 87-91.

Treatment of summer and winter wheat seed with azotobacterine; crop yields from 1950 to 1954. Tables.

9909* Experiment in the Use of Organic and Mineral Mixtures. **Opyt primeneniia organo-mineral'nykh smesei.** (Russian.) T. V. Chanov, I. N. Panteleev, and A. V. Dorozhnov. *Zemledelie*, v. 3, no. 5, May 1955, p. 66-72.

Mixtures of lime, superphosphates, phosphorite, composts, etc., used on the soils of several areas. Yields of potatoes, cereal grain plants, and cabbage. Recommendations. Tables.

Agriculture

Books and Miscellaneous Publications

9910 Handbook of Food and Agriculture. Fred C. Blanck, editor. 1039 p. 1955. Reinhold Publishing Corp., New York. (TP370 B59h)

Information on soils and plant growth, fertilizers, insecticides, nutrition, storage of raw products, food processing, preservation, packaging, and waste disposal.

9911 The Contribution of Atomic Energy to Agriculture. 87 p. 1954. U. S. Government Printing Office, Washington, D. C. (QH505 Un3.24c)

Evaluation of the possibility of using ionizing radiation to sterilize food and pharmaceuticals.

See also:

10033 (ethylene *bis*-dithiocarbamate esters as fungicides)
10335 (plant temperature fluctuations)
10339 (plant micro-climatology)
10343 (biology of deserts)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

9912* A Method for Determining the Freezing Points of Biological Fluids. G. R. Hervey. *Analyst*, v. 80, Apr. 1955, p. 284-289.

Deals with 0.1 ml. or less with accuracy of 0.01 C in the range of 0 to −5 C. Graphs, diagram, circuit diagram. 6 ref.

9913* Synthesis of Amino Acids by *Aerobacter aerogenes*. Eric B. Fowler and C. H. Werkman. *Archives of Biochemistry and Biophysics*, v. 56, May 1955, p. 22-27.

Conditions affecting synthesis of glutamate, aspartate, and alanine. Tables. 9 ref.

9914* Studies in the Mode of Action of Ionizing Radiations. Influence of Cell Concentration on Lethal Effects of X-Rays on *Escherichia coli*. Carissimo Biagini. *Archives of Biochemistry and Biophysics*, v. 56, May 1955, p. 38-44.

Particular reference to the interpretation of the mechanism of indirect action on extremely diluted cell suspensions. Graphs. 29 ref.

9915* Ultraviolet Absorption Spectra of Peptides. II. Glycine Peptides Containing More Than One Substituted Amide Link. Leo J. Saidel. *Archives of Biochemistry and Biophysics*, v. 56, May 1955, p. 45-58.

Includes graphs, table. 9 ref.

9916 The Use of Radioactive Isotopes in Immunological Investigations. VII. Labelled Proteins and Protein Antigens Containing Both Iodine and Mustard Gas Sulphone Groups. G. E. Francis, W. Mulligan, and A. Wormall. *Biochemical Journal*, v. 60, May 1955, p. 118-122.

Includes tables. 10 ref.

9917 General Principles and Problems of Electrolyte Research. J. F. Manery. *Canadian Journal of Biochemistry and Physiology*, v. 33, May 1955, p. 453-461; disc., p. 462-465.

Electrolytic aspects of ion distribution in animal tissues and fluids. Tables, graphs, diagrams. 34 ref.

9918 The Influence of pH on the Rates of Enzyme Reactions. I. General Theory. II. The Nature of the Enzyme-Substrate Interaction. III. Analysis of Experimental Results for Various Enzyme Systems. Keith J. Laidler. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 528-561.

Includes tables, graphs. 41 ref.

9919* The Chemical Reversal of Ultraviolet Effects on Bacteria. Solon A. Ellison, Bernard F. Erlanger, and Peter Allen. *Journal of Bacteriology*, v. 69, May 1955, p. 536-540.

Includes graphs, tables. 14 ref.

9920* The Effect of Carbohydrates on the Tryptophanase Activity of Bacteria. William L. Boyd and Herman C. Lichstein. *Journal of Bacteriology*, v. 69, May 1955, p. 584-589.

Experimental materials, methods, and results. Tables, graph. 10 ref.

9921 A Computing Microphotometer for Cell Analyses. S. Bourghardt and B. Nyquist. *Journal of Scientific Instruments*, v. 32, May 1955, p. 186-189.

Principles; field of use; general construction. Diagrams, photograph. 3 ref.

9922* Protein Quality. Olof Mellander. *Nutrition Reviews*, v. 13, June 1955, p. 161-163.

Hypothesis is that proteins are utilized partly as large peptides. Experimental evidence is given for the formation of such peptides, when certain milk proteins are enzymatically digested. 7 ref.

9923* Action Spectrum for Latent Period Extension of T-1 Bacteriophage. Richard Setlow, Shirley Robbins, and Ernest Pollard. *Radiation Research*, v. 2, May 1955, p. 262-266.

Lengthening of the latent period of T1 bacterial virus by ultraviolet radiation has been investigated for various wave lengths. Graphs. 7 ref.

9924 The Relationship of the Cell Surface to Electrolyte Metabolism in Yeast. Aser Rothstein. *U. S. Atomic Energy Commission* UR-382, Apr. 11, 1955, 72 p. (UF767 Un3.1ru)

Includes diagram, tables, graphs. 71 ref.

Books and Miscellaneous Publications

9925 Vitamins in Theory & Practice. Leslie J. Harris. 4th Ed. 366 p. 1955. Cambridge University Press, Cambridge, England. (QP801.V5 H24v4)

History of vitamin development and research; deficiency diseases; healthful diets.

See also:

9897 (antibiotics in plant disease control)
10001 (analysis of biological material)
10160 (growth of mold on paint)
10343 (biology of deserts)

CERAMICS AND CONCRETE

9926 Application of Photoelasticity to the Design of Tensile Specimens for Ceramic-Metal Materials. M. B. Stiefel. *American Ceramic Society Bulletin*, v. 34, May 1955, p. 133-137.

Evaluates tests for cermets by comparing the stress distributions obtained from different types of designs of tensile specimens. Photographs, diagrams. 12 ref.

9927 Vanadium-Molybdenum Staining on Building Products. John A. Stahmann. *American Ceramic Society Bulletin*, v. 34, May 1955, p. 138-144.

Reviews cause of efflorescence and testing methods; detailed bibliography. Diagram, table.

9928 Ceramic Radomes for Aircraft. Philip S. Hessinger. *American Ceramic Society Bulletin*, v. 34, May 1955, p. 145-150.

Thermal and physical requirements; electrical considerations; types of radomes; ceramic development program. Graphs, photograph, diagram. 10 ref.

9929 The Ternary Systems Leucite-Corundum-Spinel and Leucite-Forsterite-Spinel. J. F. Schairer. *American Ceramic Society, Journal*, v. 38, May 1955, p. 153-158.

Data are of general interest to the geologists and provide basic information which can be applied to refractories and slags by the ceramist and metallurgist. Tables, graphs, diagrams. 6 ref.

9930 Phase Equilibria in the System CaO-TiO_2-SiO_2. R. C. DeVries, R. Roy, and E. F. Osborn. *American Ceramic Society, Journal*, v. 38, May 1955, p. 158-171.

Indices of refraction of glasses; composition and temperature are listed for the 12 liquidus ternary invariant points. Tables, graphs. 19 ref.

9931 The Structure of Glasses. Maurice L. Huggins. *American Ceramic Society, Journal*, v. 38, May 1955, p. 172-175.

Data on the compositions and structures of some of the silicate "ions" present in different composition ranges. Graph. 6 ref.

9932 Effect of Na_2O/K_2O Ratio on Chemical Durability of Alkali-Lime-Silica Glasses. Sudhir Sen and F. V. Tooley. *American Ceramic Society, Journal*, v. 38, May 1955, p. 175-177.

Based on an ionic-composition analysis of the results, an empirical index is suggested for determining the relative degree of ion-exchange and network-breakdown modes of reactions that occur when such mixed-alkali glasses are attacked by H_2O. Graphs, tables. 4 ref.

9933 Study of Moisture-Condensation Patterns on Glass and Crystalline Surfaces. W. C. Levengood. *American Ceramic Society, Journal*, v. 38, May 1955, p. 178-183.

Method devised for preserving the breath film for detailed study, and use of the technique for examining fracture patterns on glass surfaces. Results show effects of polishing, etching, and other treatments on fracture conditions. Photograph, micrographs. 7 ref.

9934 Viscometer for Measuring Glass Viscosity by Means of Flow Through an Orifice. R. L. Tiede. *American Ceramic Society, Journal*, v. 38, May 1955, p. 183-186.

Includes photographs, graphs, diagram, table. 3 ref.

9935* Effect of Curing on the Properties Affecting Shrinkage Cracking of Concrete Block. J. C. Saemann, C. Warren, and G. W. Washa. *American Concrete Institute, Journal*, v. 26, May 1955, p. 833-852; *ACI Proceedings*, v. 51, 1955, p. 833-852.

Influence of curing procedure on modulus of rupture, compressive strength, tensile strength, modulus of elasticity in transverse bending, moisture volume changes, and thermal volume changes. Tables, graphs, photographs.

9936* Performance of Reinforced Concrete and Concrete Masonry in Recent Western United States Earthquakes. Karl V. Steinbrugge and Donald F. Moran. *American Concrete Institute, Journal*, v. 26, May 1955, p. 853-860; *ACI Proceedings*, v. 51, 1955, p. 853-860.

Discussion includes cast-in-place reinforced concrete, precast reinforced concrete, and concrete masonry structures. The need for competent field inspection is noted, especially when unusual design or construction features are involved. Diagrams, photographs, table.

9937* Behavior of Prestressed Concrete Composite Beams. R. H. Evans and A. S. Parker. *American Concrete Institute, Journal*, v. 26, May 1955, p. 861-878; *ACI Proceedings*, v. 51, 1955, p. 861-878.

Investigation to determine whether a composite section consisting of in-situ and prestressed concrete acts monolithically with a straight line distribution of strain. Different types of prestressed elements were tested and the quality of bond for varying degrees of roughness of surface was observed. Diagrams, graphs, tables.

9938* Ball Test for Field Control of Concrete Consistency. J. W. Kelly and Milos Polivka. *American Concrete Institute, Journal*, v. 26, May 1955, p. 881-888; *ACI Proceedings*, v. 51, 1955, p. 881-888.

Simple field test for determining consistency of fresh concrete in terms of the penetration of a 6-in. 30-lb. ball. Photographs, graphs, diagram. 5 ref.

9939* Strength of Reinforced Concrete T-Beams Under Combined Direct Shear and Torsion. Earl I. Brown. *American Concrete Institute, Journal*, v. 26, May 1955, p. 889-902; *ACI Proceedings*, v. 51, 1955, p. 889-902.

Tests on longitudinally reinforced concrete sections without web reinforcement. Strength of reinforced concrete T-beams in combined direct shear and torsion are compared to strength of similar sections in direct shear alone. Theoretical torsion strengths, based upon a plastic theory, are in fair agreement with experimental results. Photographs, graphs, diagrams, tables. 8 ref.

9940* Air Entrainment in Cement and Silica Pastes. G. M. Bruere. *American Concrete Institute, Journal*, v. 26, May 1955, p. 905-919; *ACI Proceedings*, v. 51, 1955, p. 905-919.

Includes graphs, tables. 9 ref.

9941* Eccentric Bending in Two Directions of Rectangular Concrete Columns. Lu-shien Hu. *American Concrete Institute, Journal*, v. 26, May 1955, p. 921-936; *ACI Proceedings*, v. 51, 1955, p. 921-936.

Four charts, for checking stresses in a rectangular reinforced concrete section subjected to bending in two directions with or without normal compressive force, can be used for sections with symmetrical as well as non-symmetrical steel arrangement. Graphs, diagrams, tables. 8 ref.

9942* Small Glass Parts to Play Big Role in TV and Radio. *American Glass Review*, v. 75, May 1955, p. 8-9.

New manufacturing techniques. Photographs.

9943* The Technological Behavior of Lime-Rich Alumina Cements as a Function of Magnesium-Oxide Content in the Clinker. **Das technologische Verhalten kalkreicher Tonerdezemente in Abhängigkeit vom Magnesiumoxydgehalt im Klinker.** (German.) E. Eipeltauer. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 100, no. 3, Mar. 1955, p. 117-120.

Mechanical tests, and X-ray and microscopic investigations of the effect of MgO on the properties of cement. Graphs, tables, micrographs. 3 ref.

9944 Will Clay Units Reduce Airplane Crashes? *Brick & Clay Record*, v. 126, May 1955, p. 25-27.

Tests to determine whether Postonway paving could handle Navy type jet aircraft using afterburner without damage from the heat and blast and also provide adequate load-bearing capacity and resistance to wear. Photographs, diagrams.

9945 Symposium on Surface Properties of Ceramics. *British Ceramic Society, Transactions*, v. 54, May 1955, p. 257-318.

Four papers on interaction of kaolin and water, expansion of porous silica glass, and moisture expansion of porous ceramic bodies. Graphs, diagrams, tables, photographs. 83 ref.

9946* Improved Taking-Off Device for Brick Presses. J. Winterbottom. *British Clayworker*, v. 65, May 1955, p. 57-61.

Includes photographs, diagrams.

9947 The Rheology of Portland Cement Pastes. G. H. Tattersall. *British Journal of Applied Physics*, v. 6, May 1955, p. 165-167.

Experiments with a rotation viscometer on the structural breakdown of Portland cement-water pastes. Graphs. 7 ref.

9948 The Hydration of Plaster of Paris. Fraser W. Birss and T. Thorvaldson. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 870-880.

Hemihydrate of $CaSO_4$, labelled with Ca^{45} or S^{35}, is studied during hydration with supersaturated $CaSO_4$ solution at 21 C. Tables, graphs. 2 ref.

9949 Fuel Utilization in Glass Melting. V. Furnace Performance Evaluation. D. E. Sharp and L. B. Ginther. *Ceramic Industry*, v. 64, May 1955, p. 77, 79-81.

Simple method, easy to apply, for appraising performance of any tank furnace; it is susceptible to short cuts in many phases of its procedure, or it may be refined to high precision. Tables, graphs. 14 ref.

9950 Mechanization in Glazing. R. J. Verba. *Ceramic Industry*, v. 64, June 1955, p. 83-85.

Automatic machines for dipping, flushing, and spraying. Photographs.

9951* Alumina. W. L. German. *Ceramics*, v. 7, Apr. 1955, p. 60-65.

Its manufacture and uses in the ceramic industries. Photographs. 15 ref.

9952* Effect of Heat on the Dielectric Properties of Ceramics. II. A Survey of Recent Experiments. *Ceramics*, v. 7, Apr. 1955, p. 69-75.

Includes tables, graphs. 1 ref.

Ceramics and Concrete

9953 Glass Fibres, Their Manufacture, Properties and Uses. A. de Dani. *Chemistry & Industry*, 1955, no. 18, Apr. 30, p. 482-489.

Includes table, graph, diagrams, micrographs. 9 ref.

9954* Quality Control in Fireclay Refractories. A. Elliott *Claycraft*, v. 28, May 1955, p. 489-492.

De-airing pressures; drying; deformation; kiln temperature distribution. Tests on fired products.

9955* Ferromagnetic Resonance in Silicate Glasses. **Ferromagnitnyi rezonans v silikatnykh steklakh.** (Russian.) N. S. Garif'ianov. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 503-505.

Effects of varying content of Fe_2O_3 and FeO at temperatures of 800 to 900 C. Table. 4 ref.

9956* Electrical Properties of Steatite Materials at Elevated Temperatures. **Elektricheskie svoistva steatitovykh materialov pri povyshennykh temperaturakh.** (Russian.) Kh. S. Valeev. *Elektrichestvo*, 1955, no. 4, Apr., p. 56-62.

Relation of temperature to frequency, dielectric penetrability, resistance, and linear expansion. Tables, graphs, diagram. 13 ref.

9957 The Devitrification Behavior of Glasses Used in Vacuum Techniques. O. Knapp. *Glass Industry*, v. 36, May 1955, p. 262-264, 284-285.

Investigation of lead glass and lime glass to determine the tendency to devitrification and to establish their characteristics. Tables, micrographs, graphs. 3 ref.

9958 Refractories in the Iron and Steel Industry. IV. Other Applications. Helen Towers. *Iron & Steel*, v. 28, May 1955, p. 173-176.

Critical review of refractories for blast furnace stoves and ladles, and for casting pits. 60 ref.

9959* Structure of Sodium Borosilicate Glasses in Connection With the Phenomenon of Opalescence. **O strukture natrievoborosilikatnykh stekol v sviazi s iavleniem opalestsentsii. II.** Investigation of the Structure of Porous Glasses. **Issledovanie struktury poristykh stekol.** (Russian.) S. P. Zhdanov, E. A. Porai-Koshits, and D. I. Levin. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1955, no. 2, Mar.-Apr., p. 197-207.

Includes micrographs, graphs, tables. 12 ref.

9960 Super Refractories Give Operators Unique Range of Properties. B. M. Johnson, A. A. Turner, and H. S. Schroeder. *Journal of Metals*, v. 7, May 1955, p. 601-607.

Bonded refractories of silicon carbide, fused alumina, and fused mullite—all products of the electric furnace. Tables, diagrams, photographs. 6 ref.

9961 Solid-State Reactions and Dielectric Properties in the Systems Magnesia-Zirconia-Titania and Lime-Zirconia-Titania. L. W. Coughanour, R. S. Roth, S. Marzullo, and F. E. Sennett. *Journal of Research, National Bureau of Standards*, v. 54, Apr. 1955, p. 191-199.

Compatibility relations determined; $CaO \cdot ZrO_2 \cdot 2TiO_2$ is reported. Tables, graph, phase diagram. 27 ref.

9962 The System of Lime, Silica, and Water at 180°C. Richard B. Peppler. *Journal of Research, National Bureau of Standards*, v. 54, Apr. 1955, p. 205-211.

Objectives are to identify products and determine conditions for their formation. Tables, graphs. 14 ref.

9963 Ceramics for Rockets. W. H. Duckworth and J. J. Krochmal. *Ordnance*, v. 39, May-June 1955, p. 999-1001.

Lining the motors of jet-propulsion power plants with ceramics can solve the troublesome problems of heat transfer and erosion of the nozzle throat due to chemical or mechanical causes. Diagrams.

9964 Investigations Into the Structure of Liquid Silicates. J. O'M. Bockris. *Record of Chemical Progress*, v. 16, no. 1, 1955, p. 23-38.

Application of chemistry and integration with physical findings. Table, graph, diagrams. 23 ref.

9965* Technology of Concrete With High Strength Properties. **La technologie du béton à haute résistance.** (French.) A. Hummel. *Revue des matériaux de construction, C*, 1955, no. 474, Mar., p. 79-86; disc., p. 86.

Includes graphs, tables. 3 ref.

9966* Manufacture of Glass Pipe by the Method of Vertical Drawing. **Proizvodstvo stekliannykh trub sposobom vertikal'nogo bezlodochnogo vytiagivaniia.** (Russian.) I. E. Shapiro, G. V. Pototskaia, I. M. Bruk, D. V. Zalizniak, and E. P. Mel'nik. *Steklo i Keramika*, v. 12, no. 4, Apr. 1955, p. 4-8.

Equipment and methods. Diagrams, graph.

9967 The Effect of Radiation Damage on the Thermal Conductivity of Graphite. Alan W. Smith. *U. S. Atomic Energy Commission, AECD-3652*, 8 p. (UF767 Un3m)

Includes graphs. 4 ref.

9968 The Measurement of Thermal Conductivity of Refractory Materials. F. H. Norton and W. D. Kingery. *U. S. Atomic Energy Commission, NYO-6449*, Apr. 1955, 16 p. (UF767 U3ny)

Thermal conductivity data for SiC, frit-bonded and Si bonded SiC, HfO_2 and 95 MgO-5 SiO_2. Graphs, diagrams, table.

9969* Structure of Glass and the Strength of Glass Fibers. **Struktura stekla i prochnost' stekliannykh volokon.** (Russian.) G. M. Bartenev and A. N. Bovkunenko. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 3, Mar. 1955, p. 508-512.

Influence of temperature and other drawing variables on strength and homogeneity of the fibers produced. Graphs. 18 ref.

9970* Nature of the Energy of Activation and Experimental Data of the Flow of Glass-Forming Substances Not Readily Fusible. **Priroda energii aktivatsii i eksperimental'nye dannye tekuchesti tugoplavkikh stekloobrazuiushchikh veshchestv.** (Russian.) R. L. Miuller. *Zhurnal Prikladnoi Khimii*, v. 28, no. 4, Apr. 1955, p. 363-371.

Energies of chemical valence bonds for oxides of Si and B; role of breaking of bonds; induction period. Graphs, diagrams, tables. 7 ref.

9971* Electron-Microscopic Investigation of the Sintering of Crystals of Titanium Dioxide. **Eletronno-mikroskopicheskoe issledovanie spekaniia kristallov dvuokisi titana.** (Russian.) V. A. Dorin. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 577-580.

Sintering behavior at 1100 C. Changes in crystal form. Micrographs. 6 ref.

See also:

10022 (analysis of cements)
10448 (Be carbide systems)
10690 (ceramic cutting tools)

CHEMICAL ENGINEERING

9972* Metal Chelate Tanning Agents. Andrew J. Gard. *American Leather Chemists Association, Journal*, v. 50, May 1955, p. 255-263.

Effects of the structure of the amino acid or ligand on masking of the Cr complex, mode of tannage, and on fixation of chromium by collagen. 12 ref.

9973 The Effect of Chlorination and Subsequent Dechlorination on the Tanning Properties of Ligninsulphonates. Alan G. Newcombe and H. Borden Marshall. *Canadian Journal of Technology*, v. 33, May 1955, p. 152-160.

Includes tables. 21 ref.

9974 The Explosibility of Wet Ammonia-Air Mixtures. R. M. Clarke and George F. Wright. *Canadian Journal of Technology*, v. 33, May 1955, p. 161-168.

Report is based upon an explosion of the atmosphere above aqua ammonia in tanks. Diagrams, photograph. 10 ref.

9975* Sterilization of Water by Ultra-Violet Rays. **La stérilisation de l'eau par les radiations ultraviolettes. I-II.** (French.) E.-V. Rouir. *Centre Belge d'Etude et de Documentation des Eaux, Bulletin mensuel*, v. 6, no. 51, Jan. 1955, p. 13-17; no. 52, Feb. 1955, p. 44-47.

Use of low-pressure Hg lamps. Tables, graphs, diagrams.

9976* Demineralization of Steam Boiler Feed-Water. **Déminéralisation de l'eau d'alimentation des chaudières.** (French.) G. Costes. *Chaleur & Industrie*, v. 36, no. 357, Apr. 1955, p. 103-125.

Ion exchange and other methods; efficiency of different types; advantages and disadvantages. Tables, graphs, diagrams.

9977* **Filter Presses.** Philip Kriegel. *Chemical Engineering Costs Quarterly*, v. 5, Apr. 1955, p. 36-54.

Types of filters, design factors, costs, and examples. Tables, graphs, diagrams.

9978 Aromatics by SO_2 Extraction. James B. Daly. *Chemical Processing*, v. 18, June 1955, p. 10-12.

Describes Continental Oil Company's plant, the first refinery to isolate benzene, toluene, and oxylene simultaneously. Photograph, flowsheet.

9979 Thermal Conductivity of Liquids. D. S. Davis. *Chemical Processing*, v. 18, June 1955, p. 200.

Nomograph shows variation of conductivity with temperature for 11 solvents. 2 ref.

9980 Adsorption as an Engineering Tool. I. C. L. Mantell. *Chemistry in Canada*, v. 7, May 1955, p. 90, 92, 94, 96.

Treats gases, vapors, liquids, solutes, ions, dispersed materials, and colloids in ten different aspects. (To be continued.)

9981 Corrosion in the Petroleum Industry. I. F. H. Garner and A. R. Hale. *Corrosion Technology*, v. 2, May 1955, p. 143-146.

Reference to various types of operation in the petroleum industry. Photographs, table. 6 ref.

9982* Paraffin and Naphthene Hydrocarbons of Cracking-Kerosene From Shale Oil. **Parafinovye i naftenovye uglevodorody kreking-kerosina slantsevogo degtia.** (Russian.) Z. T. Zonova and V. A. Lanin. *Doklady Akademii Nauk SSSR*, v. 101, no. 5, Apr. 11, 1955, p. 873-875.

Chromatographic separation of catalysis products and of hydrocarbons obtained by dehydrogenation. Characteristics of fractions obtained. Tables. 7 ref.

9983 Vegetable Oil Refining. Kevin J. Bradley and Fred H. Smith. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 868-875.

Describes Sharples' demonstration and research refinery which is available to manufacturers. Tables, flowsheet, photographs. 32 ref.

9984 Multiple Cell Fluorine Plant; Design and Operation. J. Jacobson, W. K. Henderson, T. P. Fleming, R. W. Levin, and J. A. Marshall. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 878-883.

Includes table, diagrams, photograph.

9985 Purification of Gases for Ammonia Manufacture. R. Egalon, R. Vanhille, and M. Willemyns. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 887-899.

Removal of carbon monoxide by cuprammonium carbonate solutions and thermal regeneration of the absorption solution. Nomogram for absorptive power of complex. Tables, graphs, nomogram, photographs. 8 ref.

9986* The Size Distribution and Entrainment of Droplets. F. H. Garner, S. R. M. Ellis, and J. A. Lacey. *Institution of Chemical Engineers, Transactions*, v. 32, no. 4, 1954, p. 222-234; disc., p. 234-235.

Determination made in a pilot plant and in a 4 inch glass evaporator from the evaporation of water and potassium nitrate solutions. Diagrams, tables, graphs. 20 ref.

9987* The Use of the Condensation Products of Dicyandiamide and Formaldehyde in Tanning. **Die gerberische Verwendung von Kondensationsprodukten aus Dicyandiamid und Formaldehyd.** (German.) A. Küntzel and E. Quendt. *Leder*, v. 6, no. 4, Apr. 1955, p. 73-80.

Includes graphs. 8 ref.

9988* Introduction to Fluidization. **Bevezetés a fluidizációba.** (Hungarian.) Tibor Blickle and Pál Fejes. *Magyar Kémikusok Lapja*, v. 10, no. 4, Apr. 1955, p. 116-122.

Qualitative relationships of fluid systems and disorders occurring during fluidization; fluid systems with two components; catalytical cracking of hydrocarbons. Diagram, graphs. 10 ref.

9989* Mechanism of the Deasphaltization of the Residual Petroleum Products, by Liquid Propane. **O mekhanizme deasfal'tizatsii ostatochnykh neftianykh produktov zhidkim propanom.** (Russian.) N. F. Bogdanov. *Neftianoe Khoziaistvo*, v. 3, no. 5, May 1955, p. 63-69.

Principles of coagulation. Properties of the deasphaltizate. Tables.

9990 How to Calculate Multidraw Towers. N. H. Prater and C. W. Boyd. *Oil and Gas Journal*, v. 53, May 2, 1955, p. 72-82.

Information developed can be used in economic studies of optimum design, studies involving the relationship of the variables on separation of oil streams, checking tower efficiencies, and as a means of designing new fractionation systems. Graphs, tables, diagram. 13 ref.

9991 Development and Application of Water-in-Oil Emulsion Drilling Muds. M. D. Nelson, B. C. Crittendon, and G. A. Trimble. *Oil and Gas Journal*, v. 53, May 2, 1955, p. 83-86, 89.

Formulation of an inverted emulsion mud, composed of emulsifiers, any water-base mud, and a refined oil or stabilized crude, is applicable to most all drilling conditions. Method of measuring its stability has also been developed. Graphs, tables.

9992 Maintenance and Instrument Short Cuts. F. Lawrence Resen. *Oil and Gas Journal*, v. 53, May 2, 1955, p. 103, 105.

More on-the-job ideas resulting in improved operating conditions and lower costs. Diagram, photographs.

9993 How Richfield Tackled Hydrogen Blistering. B. W. Neumaier and C. M. Schillmoller. *Oil and Gas Journal*, v. 54, May 23, 1955, p. 107-110.

Corrosion control measures include H_2S removal and water washing procedures. Diagrams, tables, photograph. 9 ref.

9994 Here's What They're Doing to Stop That Costly Corrosion in Refining Equipment. Gerald L. Farrar. *Oil and Gas Journal*, v. 54, June 6, 1955, p. 120, 123.

Corrosion reactions; O summary of refinery experience. Photographs.

9995* Experiments in the Removal of Silicon From Water, for Use in Boilers, by the Waste Slurry From Brine Purification in the Soda Industry Plants. **Próby odkrzemiania wody do celów kotłowych za pomocą odpadkowego szlamu z oczyszczania solanki w zakładach przemysłu sodowego.** (Polish.) W. Krygielowa and J. Kucharski. *Przemysł Chemiczny*, v. 11, no. 5, May 1955, p. 230-232.

Comparison of results using processed and unprocessed slurry. Tables, graph, diagram. 5 ref.

9996* Cathodic Protection Against Corrosion in the Chemical Industries. **Anwendung des kathodischen Schutzes in der chemischen Industrie.** (German.) W. Rausch. *Werkstoffe und Korrosion*, v. 6, no. 4, Apr. 1955, p. 189-196; disc., p. 197-198.

Theory, materials, and procedures for protection of pipe-lines, sluice-pipes, coolers, condensors, and hot water tanks against corrosion by aqueous electrolytes. Graphs, diagrams, photographs. 6 ref.

Books and Miscellaneous Publications

9997 Water Supply Engineering. Harold E. Babbitt and James J. Doland. McGraw-Hill Series in Civil Engineering. 5th Ed. 608 p. 1955. McGraw-Hill, New York. (TD345 B11w5)

Information on the latest accepted practices applicable to public, private, and industrial water supplies.

See also:

10303 (chemical product development)
10794 (water purification in reactors)

CHEMISTRY—ANALYTICAL AND INORGANIC

9998* A Diffusion-Equilibration Method as a Stage in the Determination of the Deuterium Oxide Content in 1—2 Microlitres of Fluid. (English.) Lars Garby. *Acta Chemica Scandinavica*, v. 9, no. 2, 1955, p. 339-341.

Method utilizes diffusion of HDO through a gas membrane; equilibrium occurs in about 100 min. Table, diagram. 6 ref.

9999 The Effect of Ring Strain on the Ultraviolet Spectra of α,β-Unsaturated Carbonyl Compounds. W. M. Schubert and W. A. Sweeney. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2297-2300.

Qualitative correlation is established. 25 ref.

10000* The Theoretical Basis of "Sensitivity Tests" and Their Application to Some Potential Organic Reagents for Metals. H. Irving and H. S. Rossotti. *Analyst*, v. 80, Apr. 1955, p. 245-260.

Tabulates and discusses results of "sensitivity tests" on four complexing reagents with 33 cations. Tables, graphs. 51 ref.

10001* The Spectrophotometric Identification and Determination of Parathion. A. I. Biggs. *Analyst*, v. 80, Apr. 1955, p. 279-283.

As little as 0.1 mg. in 10 ml. can be determined; applies to extracts from biological material. Tables, graphs, ultra-violet. 11 ref.

10002* Determination of Small Quantities of Thorium by Radioactivation. E. N. Jenkins. *Analyst*, v. 80, Apr. 1955, p. 301-313.

Thorium-232 is activated to Th^{233} by pile irradiation, chromatographically separated, and measured. Tables. 30 ref.

10003* Separation of Small Quantities of Saturated Higher Fatty Acids by Reversed-Phase Paper Chromatography. Billy D. Ashley and Ulrich Westphal. *Archives of Biochemistry and Biophysics*, v. 56, May 1955, p. 1-10.

Describes techniques developed. Diagrams, graphs, table. 18 ref.

10004* Report on Molybdenum in Soils and Methods for Its Determination. W. O. Robinson. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 246-249.

Analytical methods and results. Tables. 4 ref.

10005* Report on Pesticides. Thomas H. Harris. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 287-290.

Determination of benzene hexachloride, parathion, pyrethrins, rotenone, dieldrin, and quaternary ammonium compounds. 3 ref.

10006* Report on Sodium in Plants. Eunice J. Heinen. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 391-399.

Study to determine reliability of a direct extraction procedure for removing Na from dried plant tissue, and possible advantages of such a practice over dry ashing techniques. Use of various extractive agents. Tables. 4 ref.

10007* Report on Boron in Mixed Fertilizers. Rodney C. Berry. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 407-413.

Determination of B in mixed acids with colemanite added and with borax added. Tables.

10008* Report on Phosphoric Acid in Fertilizers. K. D. Jacob and W. M. Hoffman. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 421-435.

Investigation of volumetric method in analysis of three samples by 32 collaborators. Tables. 5 ref.

10009* A Simple Apparatus for Automatically Controlling the Distillation of Fluorine as Hydrofluosilicic Acid. E. D. Schall and H. G. Williamson. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 452-454.

Includes photograph, diagram. 5 ref.

10010* Infrared Determination of Dieldrin and DDT in Mixtures. Glenn E. Pollard, William M. Saltman, and Peter Yin. *Association of Official Agricultural Chemists, Journal*, v. 38, May 1955, p. 478-482.

Procedure determines dieldrin and DDT simultaneously in insecticidal dust. Tables, diagram. 11 ref.

10011* The Determination of Oxygen, Nitrogen and Hydrogen in Metals and Alloys. G. S. Martin. *Australasian Engineer*, 1955, Mar., p. 58-62.

Includes tables, diagram. 65 ref.

10012* Determination of a Small Amount of O Dissolved in Water Used in Medium and High Pressure Boilers. **Le dosage de petites teneurs en oxygène dissous dans les eaux pour chaudières haute et moyenne pression.** (French.) Armand Berger, Jacques Pirotte, and Ed. Leclerc. *Centre Belge d'Etude et de Documentation des Eaux, Bulletin (trimestrielle)*, 1955, no. 27, p. 30-36.

Description and results of experimental investigation using spectrophotometric method. Tables. 7 ref. (To be continued.)

10013 Assure Absence of Impurities From Color Film. Don H. Anderson and Gordon Weyermuller. *Chemical Processing*, v. 18, May 1955, p. 62-63, 66.

Micro infra-red technique, using KB wafers, can run spectrogram with only 0.000025 g. of sample. Photographs.

10014 Separate Components—Then Analyze. *Chemical Processing*, v. 18, June 1955, p. 140-141.

Describes commercial multicell extractor. Diagram, photograph.

10015 Carbon in Steel. A. P. H. Jennings. *Iron & Steel*, v. 28, May 1955, p. 208-210.

A review of physical methods of determination. 12 ref.

10016 Hydrolysis of the Uranyl Ion and Formation of Sodium Uranates. **Hydrolyse de l'ion uranyle et formation d'uranates de sodium.** (French.) J. Sutton. *Journal of Inorganic and Nuclear Chemistry*, v. 1, Mar. 1955, p. 68-74.

Details preparation of $Na_2U_{16}O_{49}$, $Na_2U_2O_7$, and $Na_2U_7O_{22}$. Tables, graphs. 11 ref.

10017* Spectrographic Determination of the Gallium Content of Bauxites. **Bauxitok galliumtartalmának színképelemőz meghatározása.** (Hungarian.) Tivadarné Kotsis and Aranka Huber. *Kohászati Lapok*, v. 10, no. 4, Apr. 1955, p. 184-186.

Includes tables. 14 ref.

10018* Chromatographic Separation of Uranium VI. **Az urán(VI) papírkromatográfiás elválasztása.** (Hungarian.) Gyula Almássy and Mihály Vigvári. *Magyar Kémiai Folyóirat*, v. 61, no. 4, Apr. 1955, p. 109-111.

Systematic variation of the acid content of solvent for optimum composition. Investigation of accuracy of the determination. Graphs. 9 ref.

10019* Direct Determination of the Oxygen Content of Organic Compounds. **Szerves vegyületek oxigén tartalmának közvetlen meghatározása.** (Hungarian.) László Mázor. *Magyar Kémikusok Lapja*, v. 10, no. 3, Mar. 1955, p. 77-81.

Suggestions for improving the Schütze-Unterzaucher method. Photographs, diagram. 23 ref.

10020 Radioactivation Analysis of Arsenic in Silicon. J. A. James and D. H. Richards. *Nature*, v. 175, Apr. 30, 1955, p. 769-770.

Applicable to traces on the order of 0.001 to 1.0 p.p.m. of group V elements. Graph. 1 ref.

10021* Infra-Red Spectrometer in Analysis of Mineral Oils and Greases. **Le spectromètre infra-rouge dans l'analyse des huiles et graisses minérales.** (French.) L. Robert and J. Favre. *Revue de l'institut français du pétrole et Annales des combustibles liquides*, v. 10, no. 3, Mar. 1955, p. 164-169.

Method of application. Determination of natural or synthetic origin. Graphs.

10022* New Methods for Rapid Chemical Analysis of Cements. **Méthodes nouvelles d'analyse chimique rapide des ciments.** (French.) L. Burglen and P. Longuet. *Revue des matériaux de construction, C,* 1955, no. 474, Mar., p. 59-69.

Includes tables, graph, diagrams. 8 ref.

10023* Recent Progress in Microchemistry. **Progrès récents en Microchimie.** (French.) A. Lacourt. *Silicates Industriels,* v. 20, no. 3, Mar. 1955, p. 110-118.

Microtitrometry; absorptiometric analysis; chromatography; microanalysis of mixtures of gases. Tables, graphs. 27 ref.

10024 The Flame Photometric Determination of Calcium in Plant and Biological Materials. A. Strasheim and J. P. Nell. *South African Chemical Institute, Journal,* new ser., v. 7, no. 2, Sept. 1954, p. 79-89.

Interferences that limit accuracy of analysis; ashing procedure; applications. Tables, graphs. 7 ref.

10025* Methods for the Determination of Moisture. **Metody opredeleniia vlazhnosti.** (Russian.) D. I. Riabchikov and V. K. Beliaeva. *Uspekhi Khimii,* v. 24, no. 2, 1955, p. 240-248.

Includes tables, drawings. 78 ref.

10026* New Developments in Methods of Isolating the Rare-Earth Elements. **Novoe v sposobakh razdeleniia redkozemel'nykh elementov.** (Russian.) D. I. Riabchikov and E. A. Terent'eva. *Uspekhi Khimii,* v. 24, no. 3, 1955, p. 260-274.

Fractional crystallization; "homogeneous" precipitation; extraction by organic solvents; separation by "ionites" (ion-exchanging synthetic resins); methods based on: change of valence, and on different mobilities of ions. 74 ref.

See also:

10069 (ion exchangers in analytical chemistry)
10074 (analysis of thenoyltrifluoroacetone)
10091 (infra-red spectra solutions)
10119 (analysis of halides)
10338 (phosphorus determination in sea-water)
10965 (dyebath analysis)
10969 (analysis of textiles)

CHEMISTRY—ORGANIC

10027* **The Butadiene Rubbers.** W. H. Swire. *Adhesives & Resins,* v. 3, Mar. 1955, p. 60-62.

Includes photograph.

10028 The Reactions of Two Diaryl Diselenides With Mercury(II) Chloride. Edwin S. Gould and Albert Amendola. *American Chemical Society, Journal,* v. 77, Apr. 20, 1955, p. 2103-2104.

Compounds of the type ArSeHgCl are formed rather than $Ar_2Se_2 \cdot 2HgCl_2$. 9 ref.

10029 The Benzidine Rearrangement. VI. The Rearrangement of 3,3',5,5'-Tetrafluorohydrazobenzene in 2:1 Sulfuric Acid. Robert B. Carlin and S. Allen Heininger. *American Chemical Society, Journal,* v. 77, Apr. 20, 1955, p. 2272-2277.

Five compounds from this reaction are related to the other tetrahalogens. Tables. 12 ref.

10030 Peroxytrifluoroacetic Acid. V. The Oxidation of Ketones to Esters. William D. Emmons and George B. Lucas. *American Chemical Society, Journal,* v. 77, Apr. 20, 1955, p. 2287-2288.

Methyl cyclopropyl ketone reacts with a 53% yield. Table. 11 ref.

10031 Cyclic Organosilicon Compounds. III. A Four-Membered Ring Containing One Silicon Atom. Robert West. *American Chemical Society, Journal,* v. 77, Apr. 20, 1955, p. 2339-2340.

Announcement of a second independent synthesis of a Si-containing 4-ring. 6 ref.

10032* **A Study of Carriers in Dyeing Dacron Polyester Fiber.** C. L. Zimmerman, J. M. Mecco, and A. J. Carlino. *American Dyestuff Reporter,* v. 44, Apr. 25, 1955, p. 296P-302P.

Includes tables, graphs, micrographs. 10 ref.

10033* **The Synthesis and Investigation of Some Ethylene *bis*-Dithiocarbamate Esters as Fungicides.** Alfred P. Collins and Gail A. Wiese. *American Pharmaceutical Association, Journal, (Scientific Ed.),* v. 44, May 1955, p. 310-313.

Five esters were compared to undecylenic acid by action on five pathogenic fungi; they were equal or superior to this acid. Table. 10 ref.

10034 The Vapor Phase Photolysis of Hexafluoroacetone in the Presence of Methane and Ethane. P. B. Ayscough, J. C. Polanyi, and E. W. R. Steacie. *Canadian Journal of Chemistry,* v. 33, May 1955, p. 743-749.

The radical CF_3- abstracts H more readily than does CH_3-. Table, graph. 14 ref.

10035 Oxidation of Alkenes by Mercuric Salts. D. A. Shearer and George F. Wright. *Canadian Journal of Chemistry,* v. 33, May 1955, p. 1002-1033.

Products from alkenes in methanol are 1,2-dimethoxyethanes in which the oxidations are stereospecific. Tables, graphs. 42 ref.

10036 The Preparation of Aromatic Aldehydes by Means of the Dinitrogen Tetroxide Reagent. B. O. Field and J. Grundy. *Chemical Society, Journal,* 1955, Apr., p. 1110-1112.

Simplicity and high yields suggest this as a general procedure. Tables. 9 ref.

10037 The Reactions of Highly Fluorinated Organic Compounds. VIII. The Gas-Chromatographic Separation on a Preparative Scale, and Some Reactions, of 3H- and 4H-Nonafluorocyclohexene. D. E. M. Evans and J. C. Tatlow. *Chemical Society, Journal,* 1955, Apr., p. 1184-1188.

Perfluorocyclohexene also synthesized. 9 ref.

10038 Some Derivatives of Diphenylamine. S. G. P. Plant and C. R. Worthing. *Chemical Society, Journal,* 1955, Apr., p. 1278-1281.

Syntheses for eight derivatives, some from *N*-benzoyldiphenylamine by a Friedel-Crafts reaction. 12 ref.

10039 Heterocyclic Fluorine Compounds. II. *Bz*-Monofluoroindoles. F. L. Allen, J. C. Brunton, and H. Suschitzky. *Chemical Society, Journal,* 1955, Apr., p. 1283-1286.

Four benzene monofluoroindoles were made by Fischer synthesis. Ultra-violet spectra. 7 ref.

10040 Elucidation of the Mechanism of the Michael Condensation With Oxygen-18 as Tracer. I. The "Abnormal" Reaction. David Samuel and David Ginsburg. *Chemical Society, Journal,* 1955, Apr., p. 1288-1291.

Condensation of dialkyl methylmalonates with ethyl crotonate or ethyl cinnamate. 17 ref.

10041 Dithiols. XV. Some Polyhydroxy-Derivatives of 3:4-Dimercaptobutanol. XVI. The *O*-β-*D*-Glucoside of 1:3-Dimercaptopropan-2-ol. XVII. *S*-Benzyl Derivatives of 2:3-Dimercaptopropanol and 1:3-Dimercaptopropan-2-ol. XVIII. Some Water-Soluble Derivatives Containing the Sulphonic Acid Group. N. S. Johary and L. N. Owen. *Chemical Society, Journal,* 1955, Apr., p. 1292-1311.

37 ref.

10042 The Thermal and Photochemical Decomposition of Triphenylhydrazine. P. F. Holt and B. P. Hughes. *Chemical Society, Journal,* 1955, Apr., p. 1320-1323.

Studied with N^{15} labeled triphenylhydrazine. 7 ref.

10043 The Preparation of Glycerol Iodides. T. H. Bevan, T. Malkin, and D. B. Smith. *Chemical Society, Journal,* 1955, Apr., p. 1383-1384.

Methods are reviewed. 7 ref.

10044 Direct Fluorination of Liquid Hydrocarbons and Their Derivatives. J. M. Tedder. *Chemistry & Industry,* 1955, no. 18, Apr. 30, p. 508-509.

Reaction is safely carried out at solid CO_2 temperatures with N diluted F under ultra-violet light. Graph, diagram. 9 ref.

Chemistry—Organic

10045* Organosilicon Compounds. **Organosiliciumverbindungen. III.** Comparison of the Reactivities of the Alkoxysilanes With the Grignard Reagent. **Vergleich der Reaktivitäten der Alkoxysilane mit dem Grignardreagens.** (German.) J. Rathouský, V. Bažant, and F. Šorm. *Collection of Czechoslovak Chemical Communications*, v. 20, no. 1, Feb. 1955, p. 72-81.

Reactivity of various alkoxy-groups bound to the Si, during a reaction with methyl magnesium chloride. Intermediate products described. Graphs, tables. 20 ref.

10046* Acidity and Catalytic Properties of Alumosilicates. **Kislotnost' i kataliticheskie svoistva aliumosilikatov.** (Russian.) K. V. Topcheva and I. F. Moskovskaia. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 517-520.

Kinetics of cracking of cumol. Relation of cracking rate constant to amount of sodium ions adsorbed by catalysts. Graphs, tables. 16 ref.

10047* Esters of Dimethylamidophosphorous and Dimethylamidothiophosphoric Acids. **Efiry dimetilamidofosforistoi i dimetilamidotiofosfornoi kislot.** (Russian.) B. A. Arbuzov and D. Kh. Iarmukhametova. *Doklady Akademii Nauk SSSR*, v. 101, no. 4, Apr. 1, 1955, p. 675-677.

Data on synthesis of these esters. Tables. 2 ref.

10048* Reactions of Propyl Bromide and Butyl Bromide With Silicon. **Reaktsii bromistogo propila i bromistogo butila s kremniem.** (Russian.) N. S. Nametkin, A. V. Topchiev, and L. I. Kartasheva. *Doklady Akademii Nauk SSSR*, v. 101, no. 5, Apr. 11, 1955, p. 885-887.

Includes tables. 6 ref.

10049* Mechanism of the Conversion of α-Naphthaline Sulfo Acid Into β-Naphthaline Sulfo Acid. **O mekhanizme prevrashcheniia α-naftalinsul'fokisloty v β-naftalinsul'-fokislotu.** (Russian.) S. E. Shnol', Ia. K. Syrkin, V. I. Iakerson, and L. I. Bliumenfel'd. *Doklady Akademii Nauk SSSR*, v. 101, no. 6, Apr. 21, 1955, p. 1075-1078.

Study methods include chromatographic analysis and use of radioactive tracers. Graph, table. 4 ref.

10050* Investigations in the Field of the Derivatives of Unsaturated Phosphinic Acids. **Issledovaniia v oblasti proizvodnykh nepredel'nykh losfinovykh kislot. V.** Esters of β-Ethoxyvinylphosphinic, β-n-Propoxyvinylphosphinic, β-n-Butoxyvinylphosphinic, and β-n-Hexyloxyvinylphosphinic Acids. **Efiry β-etoksivinilfosfinovoi, β-n.propoksivinilfosfinovoi, β-n.butoksivinilfosfinovoi i β-n.geksiloksivinilfosfinovoi kislot.** (Russian.) K. N. Anisimov, N. E. Kolobova, and A. N. Nesmeianov. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1955, no. 2, Mar.-Apr., p. 240-248.

Includes tables. 13 ref.

10051* Conversions of Mercapto Amino Acids. **Prevrashcheniia merkaptoaminokislot. IV.** α,β-Dihaloido-α-Acylaminopropionic Acids. **α-β-Digaloido-α-atsilaminopropionovye kisloty. V.** β-Haloido-α-oxy-α-Acylaminopropionic Acids and Their Derivatives. **β-Galoido-α-oksi-α-atsilaminopropionovye kisloty i ikh proizvodnye. VI.** β-Haloido-α-Acylaminoacrylic Acids and Their Derivatives. **β-Galoido-α-atsilaminoakrilovye kisloty i ikh proizvodnye.** (Russian.) O. V. Kil'disheva, L. P. Rasteikene, I. L. Knuniants, and M. G. Lin'kova. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1955, no. 2, Mar.-Apr., p. 260-288.

Includes tables. 37 ref.

10052* Study of Dimerization of Linoleic Acid and Polycondensation of Dimeric Acids and Di-Functional Groups. **Étude de la dimérisation de l'acide linoléique et des polycondensations a partir des acides dimères et de groupements difonctionnels.** (French.) Bertrand de Surville. *Journal des recherches du centre national de la recherche scientifique*, 1955, no. 30, Mar., p. 169-193.

Includes tables, diagram. 41 ref.

10053* Investigation in the Realm of α-Oxides of the Acetylene and Vinylacetylene Series. **Issledovanie v oblasti α-okisei atsetilenovogo i vinilatsetilenovogo riada.** (Russian.) F. Ia. Perveev. *Leningradskogo Universiteta, Vestnik, Seriia Matematiki, Fiziki i Khimii*, v. 10, no. 2, Feb. 1955, p. 173-202.

Reactions of N- and O-containing compounds with carbonyls, alcohols, and phenols. Tables. 59 ref.

10054 Reactive Hydrocarbon/Drying Oil Adducts. C. W. A. Mundy. *Oil & Colour Chemists' Association, Journal*, v. 38, May 1955, p. 219-229; disc., p. 229-232.

Reactions of 11 hydrocarbons with drying oils (generally linseed) in the vapor phase. Tables, flowsheet. 5 ref.

10055 Versatility of Nonionic Detergents. H. E. Bramston Cook. *Soap and Chemical Specialties*, v. 31, May 1955, p. 47-49, 89.

Applications in ten different industries. Tables.

10056* Solubility of Acetylene in Different Solvents. **Sur la solubilité de l'acétylène dans divers solvants.** (French.) H. Lagarde and J. Cambon. *Soudage et Techniques Connexes*, v. 9, nos. 1-2, Jan.-Feb. 1955, p. 7-11.

Standard of purity of industrial actylene; determination of impurities; influence of pressure and impurities on solubility. Tables, graphs, diagrams, photographs.

10057* Methods of Synthesis of Paraffin Hydrocarbons (Alkanes.) **Metody sinteza parafinovykh uglevodorodov (alkanov).** (Russian.) R. Ia. Levina and N. P. Shusherina. *Uspekhi Khimii*, v. 24, no. 2, 1955, p. 181-219.

Survey of all methods of preparation from ketones, aldehydes, alcohols and glycols, and by action of metals on haloid alkyls. 315 ref.

10058* Piperylene. **Piperilen.** (Russian.) A. A. Petrov and M. L. Genusov. *Uspekhi Khimii*, v. 24, no. 2, 1955, p. 220-239.

Survey of methods of preparation, physical properties, and chemical reactions, including polymerization. 257 ref.

10059* The Oscillation Structure of the Fluorescence Spectrum of Naphthalene. **Die Schwingungsstruktur des Naphthalin-Fluoreszenzspektrums. II.** Naphthalene in Durene. **Naphthalin in Durol.** (German.) Hans Christoph Wolf. *Zeitschrift für Naturforschung*, v. 10a, no. 3, Mar. 1955, p. 244-248.

Study of fluorescence spectra of solutions of naphthalene in durene and in ethanol to determine the effect of the durene crystal on the naphthalene mol. Spectrograms, tables. 11 ref.

10060* Reaction of Aluminum Hydride With Ammonia and Amines. **Über die Umsetzung von Aluminiumwasserstoff mit Ammoniak und Aminen. I.** Preparation of a Borazol Homolog "Alazol" $Al_3N_3H_6$. **Versuche zur Darstellung eines borazol-homologen "Alazols" $Al_3N_3H_6$. II.** An Aluminum Triamide $Al(NH_2)_3$. **Zur Kenntnis eines Aluminiumtriamids $Al(NH_2)_3$. III.** Preparation of a Trimethyl-Alazol $(AlHNR)_3$. **Versuche zur Darstellung eines Trimethyl-alazols. $(AlHNR)_3$. IV.** A Series of Compounds $AlH_{3-n}[N(CH_3)_2]_n$. **Zur Kenntnis einer Verbindungsreihe $AlH_{3-n}[N(CH_3)_2]_n$. V.** The Behavior of Aluminum Hydride Towards Pyridine. **Das Verhalten von Aluminiumwasserstoff gegenüber Pyridin. VI.** Alazanes of Type $AlH_3 \cdot NR_3$. **Zur Kenntnis von Alazanen des Typus $AlH_3 \cdot NR_3$.** (German.) Egon Wiberg, Adolf May, Wilhelm Gösele, and Heinrich Nöth. *Zeitschrift für Naturforschung*, v. 10b, no. 4, Apr. 1955, p. 229-238.

Includes structural formulas. 21 ref.

10061* Reaction of Aluminum Hydride With Phosphine and Arsine. **Über Versuche zur Umsetzung von Aluminiumwasserstoff mit Phosphin and Arsin.** (German.) Egon Wiberg,, Adolf May, and Heinrich Nöth. *Zeitschrift für Naturforschung*, v. 10b, no. 4, Apr. 1955, p. 239-240.

2 ref.

10062* Acetylene Derivatives. Alpha-Ketooxides and Their Conversions. **Proizvodnye atsetilena. α-ketookisi i ikh prevrashcheniia. IV.** Oxides of 2-Methyl-1,4-Hexadiene-3-one, 5-Methoxy-2-Methyl-1-Hexene-3-one and 1-Methoxy-2-Methyl-4-Hexene-3-one. **Okisi 2-metil-1,4-geksadien-3-ona, 5-metoksi-2-metil-1-geksen-3-ona i 1-metoksi-2-metil-4-geksen-3-ona. V.** Oxides of 1, 4-Hexadiene-3-one, 5-Methyl-2,5-Heptadiene-4-one and 2-Methoxy-5-Methyl-5-Heptene-4-one. **Okisi 1,4-geksadien-3-ona, 5-metil-2,5-geptadien-4-ona i 2-metoksi-5-**

metil-5-gepten-4-ona. (Russian.) I. N. Nazarov, A. A. Akhrem, and I. G. Tishchenko. *Zhurnal Obshchei Khimii*, v. 25, no. 4, Apr. 1955, p. 708-734.

Includes structural formulas. 22 ref.

10063* New Method of the Synthesis of Esters of Phosphinic and Thiophosphinic Acids. **Novyi metod sinteza efirov fosfinovykh i tiofosfinovykh kislot. XIX.** Addition of Dialkylthiophosphorus Acids and Esters of Phosphinous Acid to Unsaturated Nitriles and Vinylphosphinic Ester. **Prisoedinenie dialkiltiofosforistykh kislot i efirov fosfinistoi kisloty k nepredel'nym nitrilam i vinilfosfinovamu efiru.** (Russian.) A. N. Pudovik and N. G. Poloznova. *Zhurnal Obshchei Khimii*, v. 25, no. 4, Apr. 1955, p. 778-783.

Includes tables, structural formulas. 6 ref.

10064* Question of the Methods of Conducting Autoclave Experiments on the Hydrogenation of Hydrocarbons. **K voprosu o metodike provedeniia avtoklavnykh opytov po gidrogenizatsii uglevodorodov.** (Russian.) N. E. Vishnevskii and D. M. Maiorov. *Zhurnal Prikladnoi Khimii*, v. 28, no. 4, Apr. 1955, p. 394-401.

Critical temperature of hydrocarbons and their derivatives. Tables, graph. 27 ref.

10065* Catalytic Oxidation of Phenanthrene and Anthracene Fractions. **Kataliticheskoe okislenie fenantrena i antratsenovykh fraktsii.** (Russian.) M. V. Gortman and A. I. Golub. *Zhurnal Prikladnoi Khimii*, v. 28, no. 5, May 1955, p. 507-515.

Equipment and experimental data; temperatures and distillate amounts; analysis of individual products of first anthracene fraction. Diagram, tables, graphs. 10 ref.

10066* Dehydration of Methyl Ether of Castor Oil. **Degidratatsiia metilovogo efira ritsinolevoi kisloty.** (Russian.) V. V. Korshak and A. A. Ivanova. *Zhurnal Prikladnoi Khimii*, v. 28, no. 5, May 1955, p. 523-532.

Elementary composition of methyl ether obtained. Diffraction, viscosity, and other coefficients in relation to dehydration conditions. Tables. 11 ref.

Books and Miscellaneous Publications

10067 Theoretical Principles of Organic Chemistry. Walter Hückel. (Translated from the 7th German Ed. by F. H. Rathmann.) v. I. 904 p. 1955. Elsevier Publishing Co., Houston. (QD251 H87t7tr)

Based on inductive reasoning from the great amount of experimental data presented.

10068 Acetylenic Compounds in Organic Synthesis. R. A. Raphael. 219 p. 1955. Academic Press, New York. (QD305.H8 R12a)

Use of acetylenic compounds is presented in a critical, practical manner where the choice of alternate techniques is described. Does not include syntheses with C_2H_2.

See also:

10231 (fatty acid synthesis)
10392 (fluorocarbon compounds)
10811 (production of tritium labelled compounds)
10947 (perfluorinated butadiene)

CHEMISTRY—PHYSICAL

10069* Utilization of Ion Exchangers in Analytical Chemistry. XXIX. Sorption and Elution of Some Low-Molecular-Weight Organic Acids. (English.) Svante Berntsson and Olof Samuelson. *Acta Chemica Scandinavica*, v. 9, no. 2, 1955, p. 277-282.

Sorption and elution of glycolic, oxalic, pyruvic, gluconic, maleic, and *p*-toluenesulfonic acids, on Dowex 2 and Dowex 3 resins. Tables. 7 ref.

10070* Contribution to the Investigation of Recrystallization Processes. **Beitrag zur untersuchung der rekristallisationsvorgänge.** (German.) Z. Morlin. *Acta Physica Academiae Scientiarum Hungaricae*, v. 4, no. 3, 1955, p. 197-208.

Microscopic study of recrystallization mechanism and grain boundaries in NaCl. Micrographs. 7 ref.

10071 Kinetic Study of the Oxidation of Nitric Oxide With Oxygen in the Pressure Range 1 to 20 Mm. John Clement Treacy and Farrington Daniels. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2033-2036.

Rate of the reaction $2NO+O_2 \rightarrow 2NO_2$ is studied. Inert gases, surfaces, and temperature have little effect. Graphs. 13 ref.

10072 Kinetics of Competitive Processes When Reactive Fragments Are Produced in Pairs. Richard M. Noyes. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2042-2045.

Role of a scavenger which will compete in the recombination. Graphs. 3 ref.

10073 Ion Exchange as a Separations Method. IX. Gradient Elution Theory. Edward C. Freiling. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2067-2077.

Equations are derived for the resulting peak locations and widths; discusses theoretical limitations. Graphs. 10 ref.

10074 Polarographic Behavior of Thenoyltrifluoroacetone (TTA) and Related Compounds. Alkaline Cleavage of TTA. Complexation of TTA With Borate. Analytical Determination of TTA. Philip J. Elving and Clarence M. Callahan. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2077-2082.

Includes tables, graphs. 17 ref.

10075 The Ammonolysis of the Sulfates of Hydrazine, Methylhydrazine, Hydroxylamine and Semicarbazide, and the Ammoniation of These Bases and Certain of Their Salts. George W. Watt and William R. McBride. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2088-2093.

Products are formed quantitatively in high purity by liquid NH_3. Diagram, phase diagrams. 19 ref.

10076 The Electronic Structure of Hydrogen Fluoride. A. B. F. Duncan. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2107-2110.

Self-consistent field calculation involving at. and mol. orbitals. Tables. 20 ref.

10077 Phase Relations in the System Sodium Oxide-Uranium Trioxide-Water at 50 and 75°. John E. Ricci and Frank J. Loprest. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2119-2129.

Studied by phase rule methods. Tables, graphs, phase diagrams. 23 ref.

10078 High Temperature Heat Contents of Some Titanates of Aluminum, Iron and Zinc. K. R. Bonnickson. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2152-2154.

Measurements made up to 1800 K; heat content equations were derived. Tables, graph. 13 ref.

10079 Electrolyte Catalysis. I. The Mutarotation of Glucose in Pyridine. II. The Mutarotation of Tetramethylglucose in Nitromethane. A. M. Eastham, E. L. Blackall, and G. A. Latremouille. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2182-2187.

Includes tables, graphs. 20 ref.

10080* Calculation of HLB Values of Non-Ionic Surfactants. William C. Griffin. *American Perfumer and Essential Oil Review*, v. 65, May 1955, p. 26-29.

Includes tables.

10081 The Electrical Conductivity and Permittivity of Mixtures, With Special Reference to Emulsions of Water in Fuel Oil. C. A. R. Pearce. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 113-120.

Includes diagrams, graphs, photograph, micrographs. 19 ref.

10082 Measurement of Mass Transfer by an Electrical Conductivity Method. E. W. Gaylord and W. Forstall. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 135-138.

Development of a continuous, rapid, and inexpensive method for studying diffusion of fresh water into salt water, but restricted to incompressible flow problems. Diagrams, graph. 5 ref.

Chemistry—Physical

10083 The Determination of Molecular Weight. A. F. Sirianni and I. E. Puddington. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 755-762.

Principle based on the static measurement of the vapor pressure difference between pure solvents and solutions of the compounds. Results obtained for compounds in the mol. wt. range of 600 to 1000. Graphs, diagrams. 4 ref.

10084 Hydrogen Peroxide and Its Analogues. VII. Calorimetric Properties of the Systems H_2O-H_2O_2 and D_2O-D_2O_2. Paul A. Giguère, B. G. Morissette, A. W. Olmos, and O. Knop. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 804-820.

Heat capacity and heats of decomposition, vaporization, and mixing presented. Tables, graphs. 15 ref.

10085 Catalysis on Films of Arsenic, Antimony, and Germanium. Hugh Taylor. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 838-842.

Active only in decomposition of hydrides and deuterides among reactions studied. 5 ref.

10086 The Adsorption of Nitrogen, Oxygen, and Argon by Graphite. H. L. McDermot and J. C. Arnell. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 913-922.

Two kinds of hysteresis were shown; one due to pores, the other to intercrystalline swelling. Graphs. 7 ref.

10087 Some Thermodynamic Considerations of Surface Regions. Surface Tension, Adsorption, and Adsorption Hysteresis. E. A. Flood. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 979-1001.

Theoretical study to apply to factors which control rates of flow of fluids through porous adsorbents. Graphs. 20 ref.

10088 The Effect of Crystallinity on Rhythmic Precipitation. A. Packter. *Chemical Society, Journal*, 1955, Apr., p. 1180-1184.

Cellulose filter paper is a good substrate for two-dimensional precipitation. Tables. 13 ref.

10089 The Characteristic Infrared Absorption Frequencies of Aromatic Trifluoromethyl Compounds. R. R. Randle and D. H. Whiffen. *Chemical Society, Journal*, 1955, Apr., p. 1311-1313.

Considers characteristic frequencies of C-F stretching vibrations. Spectral data. 6 ref.

10090* Separation of Yttrium Earths by Ion Exchange. Utilization of Ethylene-Diamino-Tetra-Acetic Acid. **Séparation des terres yttriques par échange d'ions. Utilisation de l'acide éthylène-diamino-tétracétique.** (French.) Jean Loriers. *Comptes rendus*, v. 240, no. 14, Apr. 4, 1955, p. 1537-1540.

Includes graph. 3 ref.

10091* Application of Infra-Red Absorption Spectra to a Drop of Aqueous Solution. **Applications des spectres d'absorption infrarouges réalisés sur une goutte de solution aqueuse.** (French.) Clément Duval. *Comptes rendus*, v. 240, no. 16, Apr. 18, 1955, p. 1646-1648.

Studies of drops between lamella of thallium bromoiodide. Graphs.

10092* Application of the Visual-Polythermal Method to the Study of Silicate Systems. **Primenenie vizual'no-politermicheskogo metoda k izucheniiu silikatnykh sistem.** (Russian.) A. G. Bergman, A. K. Nesterova, and N. A. Bychkova. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 483-486.

Includes diagrams. 7 ref.

10093* X-Ray Investigation of Fused KNO_3 and $NaNO_3$ Salts. **Rentgenograficheskoe issledovanie rasplavlennykh solei KNO_3 and $NaNO_3$.** (Russian.) V. I. Danilov and S. Ia. Krasnitskii. *Doklady Akademii Nauk SSSR*, v. 101, no. 4, Apr. 1, 1955, p. 661-664.

Radial distribution of electronic density of liquid salts; structural units; arrangement in liquid salts compared to that in crystals. Graphs, diagrams. 4 ref.

10094* Peculiarities of the Catalytic Action of Co $(C_{11}H_{23}COO)_2$ During the Oxidation of *n*-Decane. **Osobennosti kataliticheskogo deistviia Co$(C_{11}H_{23}COO)_2$ pri okislenii *n*-dekana.** (Russian.) D. G. Knorre, Z. K. Maizus, and N. M. Emanuel. *Doklady Akademii Nauk SSSR*, v. 101, no. 5, Apr. 11, 1955, p. 895-897.

Includes graphs. 5 ref.

10095 The Calculation of Bond Lengths in Naphthalene and Anthracene. H. O. Pritchard and F. H. Sumner. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 457-462.

None of six mol. orbital approximations gave satisfactory agreement for both molecules. Tables. 15 ref.

10096 Nuclear Resonance Spectra of Rubidium and Ammonium Fluoroborates. D. Pendred and R. E. Richards. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 468-475.

Proton and F spectra at 20 and 90 K. Table, graph. 30 ref.

10097 The Photochemistry of Anthracenes. III. Inter-Relations Between Fluorescence Quenching, Dimerization, and Photo-Oxidation. E. J. Bowen and D. W. Tanner. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 475-481.

Presents an explanation for the results. Table, graphs. 6 ref.

10098 ^{14}C Isotope Effects. I. The Bicarbonate Ion-Carbonatocobaltic Complex Exchange Systems. II. The Carbon Monoxide/Phosgene Exchange. D. R. Stranks. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 492-504.

Includes tables, graph. 26 ref.

10099 Kinetics of Isotopic Exchange Reactions. IV. The Exchange Between Free Carbonate Ion and Carbonatopentammine Cobaltic Complex Ion. V. The Photochemical Carbon Monoxide + Phosgene System. VI. The Thermal Carbon Monoxide + Phosgene System. D. R. Stranks. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 505-527.

Includes tables, graphs, diagrams. 52 ref.

10100 High Temperature Thermal Conductivity of Gases. Albert J. Rothman and LeRoy A. Bromley. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 899-906.

Measurements on nitrogen, carbon dioxide, argon, and nitrogen–carbon dioxide mixtures at temperatures up to 775 C. Tables, graphs, diagrams, photograph. 30 ref.

10101 Correlating Permeability Constants of Gases Through Plastic Membranes. New Plot, Nomogram, and Thermodynamic Relation. Donald F. Othmer and Gerhard J. Frohlich. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1034-1040.

Simple method based on extensible straight-line functions; presents a nomogram for 150 reported systems. Table, graphs. 28 ref.

10102 Ignition Limits of Hydrogen Peroxide Vapor. Charles N. Satterfield, Peter J. Ceccotti, and Alonzo H. R. Feldbrugge. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1040-1043.

Studies made at 200 mm. Hg pressure when diluted with H_2O, He, N, and O. Table, graphs. 5 ref.

10103 Thermodynamic Properties of Methane-Nitrogen Mixtures. O. T. Bloomer, B. E. Eakin, R. T. Ellington, and D. C. Gami. Institute of Gas Technology Research Bulletin 21, Feb. 1955, 51 p. (TP700 In7r)

Presents thermodynamic properties of two mixtures, 90% CH_4-10% N, and 70% CH_4-30% N. Demonstrates use of data in computing energy requirements of N-separation processes. Tables, graphs, diagrams, photographs. 21 ref.

10104* Solubility Parameters. I. Theory and Calculations. Harry Burrell. *Interchemical Review*, v. 14, Spring 1955, p. 3-16.

A thermodynamic treatment of mixed solvent systems. Tables, graph, photographs. 24 ref. (To be continued.)

10105 Nucleation of Ammonium Iodide Crystals From Aqueous Solutions. J. B. Newkirk and D. Turnbull. *Journal of Applied Physics*, v. 26, May 1955, p. 579-583.

Attempts to find a quantitative relationship between the kinetics of nucleation and the atomic disregistry on the unstrained conjugate planes of the catalyst and nucleus. Graph, table, diagrams. 8 ref.

10106 On the Molecular Structure of Methyl Silicone. Eugene G. Rochow and Hugh G. LeClair. *Journal of Inorganic and Nuclear Chemistry*, v. 1, Mar. 1955, p. 92-111.

Unusual freedom of rotation of the Si-CH_3 bond, as shown by nuclear magnetic resonance, may account for certain physical properties. Graphs, diagram. 31 ref.

10107 Chemical Effects in Fission Product Recoil. G. N. Walton and I. F. Croall. *Journal of Inorganic and Nuclear Chemistry*, v. 1, Mar. 1955, p. 149-158.

Uranium oxide and KIO_3 are pile irradiated, then analyzed for I_2 and I-content. Tables, graphs, diagram. 19 ref.

10108 Rate Law and Mechanism for the Oxidation of Carbon Monoxide Over a Vanadium Oxide Catalyst. Mack F. Hughes and George Richard Hill. *Journal of Physical Chemistry*, v. 59, May 1955, p. 388-391.

Oxygen and CO_2 concentration did not effect rate, but CO pressure varied system like a unimolecular surface reaction. Table, graphs. 8 ref.

10109 A Molecular Dynamic Theory of Chromatography. J. Calvin Giddings and Henry Eyring. *Journal of Physical Chemistry*, v. 59, May 1955, p. 416-421.

Investigated for the linear range of the adsorption isotherm. Graphs. 10 ref.

10110 The Vapor Pressures of Lithium and Sodium Oxides. Leo Brewer and John Margrave. *Journal of Physical Chemistry*, v. 59, May 1955, p. 421-425.

Vapor consists of Li (or Na) atoms and O molecules. Tables, graphs. 25 ref.

10111 The Effect of Pressure on the Solubility of Solids in Non-Polar Liquids. E. P. Doane and H. G. Drickamer. *Journal of Physical Chemistry*, v. 59, May 1955, p. 454-457.

Measurements made up to 10,000 atmospheres on phenanthrene, SnI_4, C_2Cl_6, and anthracene in several solvents. Tables, graphs. 13 ref.

10112 Chemical Reactivity of CF_4 and C_2F_4 Induced by Electrical Discharge. Paul B. Weisz. *Journal of Physical Chemistry*, v. 59, May 1955, p. 464-466.

Carbon tetrafluoride reacts with SiO_2 to form Co, Co_2, O, and SiF_4; C_2F_4 forms liquid mono-olefinic products. Tables, graphs. 8 ref.

10113 The Electrical Conductance of Weak Acids in Anhydrous Hydrazine. Leon J. Vieland and Ralph P. Seward. *Journal of Physical Chemistry*, v. 59, May 1955, p. 466-469.

Five phenols and water were measured at 25 C. Tables, graphs. 13 ref.

10114 On the Kinetics of Chemisorption. Gert Ehrlich. *Journal of Physical Chemistry*, v. 59, May 1955, p. 473-477.

Presence of physically absorbed molecules result in fundamental theoretical changes. Graph. 15 ref.

10115* Thermal Investigation of Iron Ore by the Habicht Apparatus. **Vasércek termikus vizsgálata a Habicht-féle készülékkel.** (Hungarian.) Béla Vécsey. *Kohászati Lapok*, v. 10, no. 4, Apr. 1955, p. 149-151.

Operation and results achieved with apparatus registering, automatically, the endothermal and exothermal changes in state of the material during heating as a function of the time and temperature. Photographs, graphs, diagram.

10116* Investigation of Sorption of Colloids. **Issledovaniia sorbtsii kolloidov. III.** Effect of Electrolytes on Adsorption of a Sol of Humic Acid by Graphite Powder. **Vliianie elektrolitov na adsorptsiiu zolia guminovoi kisloty poroshkom grafita.** (Russian.) A. M. Koganovskii and T. M. Rovinskaia. *Kolloidnyi Zhurnal*, v. 17, no. 2, Mar.-Apr. 1955, p. 81-89.

Effect of KNO_3 and K_2SO_4, $Ca(NO_3)_2$ and $CaSO_4$. Constants of adsorption isotherms. Graphs, tables. 15 ref.

10117* Structural-Mechanical Properties of Dispersion Systems and High-Molecular Systems. **O strukturno-mekhanicheskikh svoistvakh dispersnykh i vysokomolekuliarnykh sistem.** (Russian.) N. V. Mikhailov and P. A. Rebinder. *Kolloidnyi Zhurnal*, v. 17, no. 2, Mar.-Apr. 1955, p. 107-119.

Mechanism of flow, and space lattices. Effective viscosity or active period of relaxation and shear stress in solid and liquid systems. 23 ref.

10118* Mechanism of Conjugate Solution and the Relation of the Solvent Capacity of Emulsifiers to Their Molecular Nature. **Mekhanism sopriazhennogo rastvoreniia i zavisimost' rastvoriaiushchei sposobnosti emul'gatorov ot ikh molekuliarnoi prirody.** (Russian.) E. M. Spivakova. *Kolloidnyi Zhurnal*, v. 17, no. 2, Mar.-Apr. 1955, p. 131-139.

Various systems studied, using ammonium oleate, sodium butylnaphthaline sulfonate, etc. Diagrams, graphs, table. 20 ref.

10119* The Effect of Organic Solvents on Adsorptive Indication Processes. **Adszorpciós indikálási folyamatok befolyásolása szerves oldószerekkel.** (Hungarian.) János Bognár and Szilvia Sárosi. *Magyar Kémiai Folyóirat*, v. 61, no. 5, May 1955, p. 149-154.

Considerable expansion of application of the derivatives of fluorescine in the argentometric titration of halides by means of organic solvents of small dielectric constant. Tables. 5 ref.

10120* Introduction to the Theory of Molecular Weight Determination by Measuring the Light Refraction. **Bevezetés a fényszórás mérése útján végzett molekulasúly meghatározás elméletébe. II.** (Hungarian.) Ferenc Kőrösy. *Magyar Kémikusok Lapja*, v. 10, no. 3, Mar. 1955, p. 85-89.

Light defraction and polarization; dissymetry factor; light defraction of solutions which are not ideal, thermodynamically. Average mol. wt. of multi-component solutions. Graphs. 30 ref.

10121* Thermal Conductivity of Solutions of Normal Liquids. **Teploprovodnost' rastvorov normal'nykh zhidkostei.** (Russian.) L. P. Filippov and N. S. Novoselova. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk*, v. 10, no. 3, Mar. 1955, p. 37-40.

Includes graphs, table. 4 ref.

10122* Relation of the Catalytic Activity of Ni-Al_2O_3 to the Structure and Amount of Nickel in the Catalyst. **Issledovanie zavisimosti kataliticheskoi aktivnosti Ni-Al_2O_3 ot struktury i kolichestva nikelia v katalizatore.** (Russian.) A. E. Agronomov and Iu. S. Mardashev. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk*, v. 10, no. 3, Mar. 1955, p. 83-91.

Includes graphs, tables. 21 ref.

10123 The Optical and Electrical Properties of Single Crystals of Sodium Niobate. L. E. Cross and B. J. Nicholson. *Philosophical Magazine*, v. 46, 7th ser., no. 376, May 1955, p. 453-466.

Optical strains and dielectric constants of small single crystals of sodium niobate were measured over the temperature range 190 to + 650 C. Graphs, diagrams. 9 ref.

10124 Some Vibrational Properties of Solid Helium. D. J. Hooton. *Philosophical Magazine*, v. 46, 7th ser., no. 376, May 1955, p. 485-498.

Series of experimental measurements on the specific heat and other vibrational properties of solid He are given a theoretical basis in terms of a new form of harmonic lattice dynamics. Tables, graphs. 7 ref.

10125 Thermomagnetic Analysis and the Structure of Supported Nickel Catalysts. P. W. Selwood. *Record of Chemical Progress*, v. 16, no. 1, 1955, p. 1-11.

Objectives and techniques. Graphs, diagram, photographs. 5 ref.

10126 A Relationship Between Sutherland's Constant and the Maximum Energy of Attraction Between Gas Molecules. C. J. G. Raw. *South African Chemical Institute, Journal*, new ser., v. 7, no. 2, Sept. 1954, p. 96-98.

Includes graph, table. 10 ref.

Chemistry—Physical

10127 The Liquid-Vapor Equilibria of the System Bromine Pentafluoride-Bromine Trifluoride. Ray D. Long. *U. S. Atomic Energy Commission*, ANL-5405, Mar. 1955, 120 p. (UF767 Un3.lan)

Isotherms at 50, 75, 100, 125, and 150 C were plotted and van Lear equations determined. Tables, graphs, diagrams, photographs. 36 ref.

10128* Mechanism of the Formation of Colloidal Particles. **O mekhanizme obrazovaniia kolloidnykh chastits.** (Russian.) Z. Ia. Berestneva and V. A. Kargin. *Uspekhi Khimii*, v. 24, no. 3, 1955, p. 249-259 + 4 plates.

Method of study includes use of electron microscope. Sols of titanium dioxide, silicic acid, arsenic sulfide, aluminum hydroxide, vanadium pentoxide, and gold. Micrographs. 53 ref.

10129* A Direct Determination of Thermal Diffusion Coefficients in Liquids. **Eine direkte Bestimmung von Thermodiffusionskoeffizienten in Flüssigkeiten.** (German.) Horst Korsching. *Zeitschrift für Naturforschung*, v. 10a, no. 3, Mar. 1955, p. 242-244.

Describes and demonstrates use of device based on optical deflection methods. Diagram, table. 5 ref.

10130* Kinetics of Ion-Exchange Sorption. **O kinetike ionoobmennoi sorbtsii.** (Russian.) O. M. Mamontova. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 3, Mar. 1955, p. 476-479.

Desorption method of measuring diffusion coefficients. Table, photograph, diagram. 6 ref.

10131* Adsorption of Unsaturated Gases by Activated Charcoal. **Adsorbtsiia nepredel'nykh gazov aktivirovannym uglem.** (Russian.) N. Ia. Regak and N. I. Smirnov. *Zhurnal Prikladnoi Khimii*, v. 28, no. 4, Apr. 1955, p. 433-436.

Includes graphs, diagrams. 9 ref.

Books and Miscellaneous Publications

10132 Emulsions, Foams, Detergency, Surface Phenomena. **Émulsions, mousses, détersion. Les phénomènes de surface.** (French.) Pierre Cor. 130 p. 1955. Dunod, Paris. (QD506 C81e)

Handbook containing summary discussions of surface tension, equilibrium of liquid surfaces, wetting and foaming agents, and dispersions.

10133 Processes of Crystallization. **Die Kristallisation in der Verfahrenstechnik.** (German.) Günther Matz. 194 p. 1954. Springer-Verlag, Berlin. (QD548 M43k)

Theories of crystallization; effect of ultrasound, radioactive rays, and electrical and magnetic fields.

10134 Chemical Thermodynamics. I. Prigogine and R. Defay. (Translated and Rev. from the French by D. H. Everett.) 543 p. 1954. Longmans Green and Co., London. (QC311 P93c)

First comprehensive account in English of the principles and applications of fundamental theorems, homogeneous and heterogeneous systems, stability and moderation, equilibrium displacements and transformations, solutions, azeotropy, and indifferent states.

10135 Electrolyte Solutions. R. A. Robinson and R. H. Stokes. 512 p. 1955. Academic Press, New York. (QD553 R56e)

The measurement and interpretation of conductance, chemical potential, and diffusion.

10136 Chemisorption. B. M. W. Trapnell. 265 p. 1955. Academic Press, New York. (QD506 T68c)

Experimental methods; velocities of adsorption and desorption; adsorption isotherms; heat of adsorption; mechanisms of chemisorption; mobility of adsorbed layers; catalytic specificity; mechanisms of catalytic reactions.

See also:

10564 (thermodynamic properties of Li)

COATINGS

10137 Oleoresinous Varnishes From Epoxy Resins and Drying Oils. Roy W. Tess. *American Oil Chemists' Society, Journal*, v. 32, May 1955, p. 291-295.

These varnishes, not to be confused with epoxy-fatty acid vehicles, have good exterior durability but are slow drying. Tables. 9 ref.

10138 Evaluation of "Hysoy" in Exterior Paints. A. J. Lewis, H. M. Teeter, W. T. Walton, and R. S. Haines. *American Oil Chemists' Society, Journal*, v. 32, May 1955, p. 300-302.

"Hysoy" paints have shortened dry times but are otherwise comparable on a 4-yr. exposure. Tables. 7 ref.

10139 Making the Most of the Spray Painting Method. Floyd E. Johnson. *American Paint Journal*, v. 39, May 16, 1955, p. 86 + 7 pages.

A general review.

10140 Stops Corrosion From Sulfur Compounds, Hydrochlorie Acid. H. E. Smith and Gordon Weyermuller. *Chemical Processing*, v. 18, May 1955, p. 22-24.

How 410 stainless cladding solved problems at Humble Oil & Refining Co. pipe still. Photograph.

10141 Guards Against Corrosive Iodine Fumnes. Edgar B. Witmer and Roy Helsing. *Chemical Processing*, v. 18, May 1955, p. 76-77.

Controlled with a chlorinated rubber-base enamel. Photographs.

10142* Coatings and Cathodic Protection for Steel Pipelines. II. G. I. Russell. *Corrosion Prevention and Control*, v. 2, May 1955, p. 21-24.

Joint use of cathodic protection and a high quality coating combination will continue to provide the best performance at minimum projected total cost. Photographs. 7 ref.

10143* Paint Faults and Remedies. X. H. Courtney Bryson. *Corrosion Prevention and Control*, v. 2, May 1955, p. 29-32.

Causes of discoloration and their control. Photograph. (To be continued.)

10144 The Coating of Magnesium Alloys. W. E. Allsebrook. *Corrosion Technology*, v. 2, Apr. 1955, p. 113-116.

Methods of treatment and painting used to preserve Mg alloys, extensively used in castings where lightness is essential. Photographs. 9 ref.

10145 Corrosion in the Brewing Industry. *Corrosion Technology*, v. 2, Apr. 1955, p. 117-119.

Cost of corrosion; paints and protective coatings; use of Zn-rich coatings; epoxy type resin; future developments.

10146 Preparation of Metals for Painting. R. E. Shaw. *Corrosion Technology*, v. 2, May 1955, p. 136-142.

Surveys present-day techniques; includes sections on testing, economics, and design considerations. Photographs, table, diagram.

10147 Economy in Manual Spray Gun Operation. J. Muirhead. *Electroplating and Metal Finishing*, v. 8, May 1955, p. 172-176.

Factors which influence cost and quality in manual spray painting include the correct choice of spraying equipment and materials, the training of the spraying operator, and proper supervision and process control. Photographs.

10148 Metal Spraying for Protection of Iron and Steel. *Electroplating and Metal Finishing*, v. 8, May 1955, p. 177-180.

Summary of new British and U. S. specifications for spraying for atmospheric and high-temperature protection. Tables. 4 ref.

10149 The Protection of Iron and Steel by Sprayed Coatings of Aluminium or Zinc. F. A. Champion. *Electroplating and Metal Finishing*, v. 8, May 1955, p. 180-182, 189.

Effects of coating wt. and thickness on life of steel exposed to atmospheric corrosion. Graphs, table. 12 ref.

10150* Possible Applications of Resin-Emulsion Paints. **Anwendungsbereich von Kunstharz - Emulsions - Anstrichen.** (German.) B. Schmücker. *Fette, Seifen, Anstrichmittel*, v. 57, no. 5, May 1955, p. 335-340.

Practical results of application for special purposes, e. g. for rust-proof coatings. Photographs, micrographs.

10151* Structure of Layers of Sintered Carbides Applied by the Electro-Sparking Method. **Struktura warstw natapianych elektroiskrowo weglikami spiekanymi.** (Polish.) Edmund Bryjak and Witold Missol. *Hutnik*, v. 22, no. 3, Mar. 1955, p. 77-86.

Relation of surface smoothness and thickness of applied layer to the electrical parameters of the process. Radiographic investigations of Co content and W_2C in the layer. Micrographs, tables, diagram. 14 ref.

10152 Spray Problems With Hot Lacquers. Henry G. Knaf. *Industrial Finishing*, v. 31, May 1955, p. 48 + 7 pages.

Techniques and advantages.

10153 Proper Handling and Storage of Flock. R. J. Steinfield. *Industrial Finishing*, v. 31, May 1955, p. 64-66.

Equipment and procedures for flock coatings.

10154* Paint in Civil Engineering. III. Rolt Hammond. *Industrial Finishing (London)*, v. 8, Apr. 1955, p. 210-212, 218.

Problems in painting concrete, plaster, marine structures, roofs, and harbor installations. Photographs.

10155* Metallic Coatings on Non-Metallic Surfaces. II. Lead Sulphide Films. III. Nickel Films. *Industrial Finishing (London)*, v. 8, Apr. 1955, p. 214, 216-218.

Formulations, properties, and applications.

10156 Modern Porcelain Enameling System for Stove Parts Utilizes Gas Furnaces and Ovens. *Industrial Heating*, v. 22, Apr. 1955, p. 799 + 6 pages.

Surface preparation; ground and cover coats; laboratory control. Photographs.

10157* The Prevention of Corrosion. *Institute of Marine Engineers, Transactions*, v. 67, Apr. 1955, p. 132-138.

Corrosion in air, soil, and water. Protection by means of coatings. Graphs, photographs. 14 ref.

10158 Russian Work on Sulphided Steels. W. G. Cass. *Iron & Steel*, v. 28, May 1955, p. 204, 263, 288.

Results of tests reported in Soviet publications. Table.

10159 Electroless Nickel Plating. J. L. Chinn. *Materials & Methods*, v. 41, May 1955, p. 104-106.

Advantages and applications. Plate properties. Photographs, micrograph.

10160 The Growth of Moulds on Painted Surfaces. L. D. Galloway. *Oil & Colour Chemists' Association, Journal*, v. 38, May 1955, p. 250-256; disc., p. 256-259.

Physiology, control, and testing of mold growth.

10161 Thixotropy and Paints. III. R. Quarendon. *Paint Manufacture*, v. 25, May 1955, p. 173-176.

Covers available details on thixotropic paint formulation. Photograph. 10 ref.

10162 The Mechanism of the Drying of Oils. Further Progress From Studies of Autoxidation. J. H. Skellon. *Paint Manufacture*, v. 25, May 1955, p. 186-188.

Summarizes recent work on catalytic autoxidation with gaseous O. Diagram, photograph. 10 ref.

10163 The Anti-Corrosive Value of Paints. F. Fancutt. *Paint Manufacture*, v. 25, May 1955, p. 189-194.

An international symposium of seven papers presented by the Corrosion Group of the Society of Chemical Industry. Covers priming, principles, and painting practice on steel; testing; influence of constituents and formulation.

10164 Research and Development. A Review of Progress in the Industry. *Paint Manufacture*, v. 25, May 1955, p. 195-198.

Outdoor emulsion paints and alkyd resin progress are reviewed. 41 ref.

10165 The Technology of Paper Coating. III. Organic Coatings for Paper. *Paint, Oil & Chemical Review*, v. 118, May 1955, p. 22 + 7 pages.

Discusses spirit varnish, cellulose and nitrocellulose, and polyvinyl polymers coatings. (To be continued.)

10166 The Formulation of High-Flash Lacquers and Thinners. W. F. Daggett. *Paint Technology*, v. 19, Apr. 1955, p. 131-133.

Details considerations and problems occasioned in formulating a dependable solvent with a flash point greater than 73 F. Tables. 2 ref.

10167* Red Lead Paints for Galvanized Surfaces. Charles E. Cherry, Jr. *Paint and Varnish Production*, v. 45, May 1955, p. 23-26.

Five formulations and test results from their use. Photographs.

10168* Drying Oil Technology. V. Drying Mechanisms. *Paint and Varnish Production*, v. 45, May 1955, p. 27-29, 76.

Autoxidation, thermal oxidation, and the effect of driers are considered. Photographs.

10169* Mechanism of Corrosion of Plain and Painted Iron Objects. **Ueber den Mechanismus der Rostbildung an blanken und mit Anstrichstoffen versehenen Eisengegenständen.** (German.) A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 21, no. 4, Apr. 1955, p. 121-133.

Corrosive action of water and atmosphere; paint as a protective agent and its effectiveness on corroded surfaces; corrosion mechanism under paint. Tables, drawings, diagrams. 62 ref.

10170* Several Technological Properties of Flame-Sprayed Zinc Coatings. **Ueber einige technologische Eigenschaften flammgespritzter Zinkschichten.** (German.) E. Gebhardt and H. D. Seghezzi. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 21, no. 5, May 1955, p. 162-164.

Report of experimental results on the mechanical properties of wire- and powder-sprayed specimens as a function of specimen cross section and O concentration of fuel mixture. Tables. 10 ref.

10171 Modern Developments in Paint Processes. R. L. Yeates. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 369-372.

Present trend of paint finishing is towards the use of synthetic materials and also towards the use of stoving schedules.

10172* Automatic Application of Weld-Deposited Coating on Blooming Rolls. **Avtomaticheskaia naplavka valkov bliuminga.** (Russian.) K. V. Bagrianskii, I. M. Kramchaninov, D. S. Kassov, and V. T. Sopin. *Svarochnoe Proizvodstvo*, 1955, no. 5, May, p. 20-23.

Composition of welding mixture. Welding machine used. Corrosion-, fracture-, and wear-resistance of weld-coated areas of roll. Photographs, diagrams, table, micrograph. 9 ref.

10173 Phosphate Coatings for Facilitating Cold-Working. W. Rausch and H. Fleischhauer. (Translated from the German by Jerome W. Howe.) *Wire and Wire Products*, v. 30, May 1955, p. 552, 599-603.

This process creates a firm intergrowth of the coating with the material. Phosphate solutions are commonly aqueous solutions which contain a film-forming metal, preferably zinc and phosphoric acid.

10174 Hot Dip Galvanizing Is a Science. IV. Wallace G. Imhoff. *Wire and Wire Products*, v. 30, May 1955, p. 553-556, 605.

The longer the pickling time, the more Zn is deposited as galvanized coating. Tables, photographs, graphs.

10175* Treatment and Corrosion Protection Surfaces by Means of High Vacuum Vapor Metallization. **Veredelung und Korrosionsschutz von Oberflächen durch Hochvakuum-Bedampfung.** (German.) Walter Reichelt. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 268-271.

Characteristics and techniques of the process; evaporation and condensation in high vacuum; fields of application. Photographs. 2 ref.

Coatings

See also:

10054 (drying oil adducts)
10179 (metal coatings)
10304 (paint industry of Great Britain)
10575 (electrical resistance of metallic coatings)

CORROSION

10176* **Corrosion Fatigue.** E. A. Smith. *Aeronautics*, v. 32, May 1955, p. 40-42.

Importance as a factor in safety considerations. Diagrams, graphs. 11 ref.

10177* Causes of Corrosion. **Ursachen der Korrosion.** (German.) H. Grubitsch. *Chemie-Ingenieur-Technik*, v. 27, no. 5, May 1955, p. 287-298.

Reports on tarnish and scale actions in the system metal-gas and thermodynamic treatment of corrosion actions. Diagrams, graphs, tables. 123 ref.

10178* Corrosion of Pipes and Protection Against Corrosion in Chemical Plants. **Rohrleitungskorrosion und Korrosionsschutz in chemischen Betrieben.** (German.) H. Klas and G. Heim. *Chemie-Ingenieur-Technik*, v. 27, no. 5, May 1955, p. 299-307.

Report of corrosion phenomena due to water, acids, lye solutions and gases, and their causes are clarified. Survey offered of measures for protection against corrosion, are divided in three groups; active protection, application of protective coatings, and selection of suitable materials for pipes. Diagrams, photographs, tables, graphs. 60 ref.

10179 Metal Corrosion and Protection. II. R. R. Rogers. *Chemistry in Canada*, v. 7, May 1955, p. 38-41.

Coatings for Fe, Zn, Al, and Mg; laboratory corrosion tests are discussed. Tables, graph, photograph. 16 ref.

10180 Corrosion Research Laboratories. III. The U. S. National Bureau of Standards. J. G. Thompson. *Corrosion Technology*, v. 2, Apr. 1955, p. 102-105.

Investigates corrosion of metals in underground service and in marine and other environments, with and without applied stress. Photographs. 20 ref.

10181 How Carefully Do You Control Your Salt Spray Tests? H. A. Holden. *Corrosion Technology*, v. 2, May 1955, p. 157-159, 163.

Considers the so-called "salt-fog" testing method. Tables, photograph. 14 ref.

10182* **Effects of Aluminium and Manganese on the Resistance Against Atmospheric Corrosion of Some Copper Alloys.** G. P. Chatterjee. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 211-221; disc., p. 221-222.

Behavior or Cu-Zn and Cu-Mg alloys with reference to atmospheric corrosion. Graphs, tables. 5 ref.

10183 The Influence of Vanadium Pentoxide on the High-Temperature Scaling of Heat-Resisting Alloys. W. Betteridge, K. Sachs, and H. Lewis. *Institute of Petroleum, Journal*, v. 41, May 1955, p. 170-180.

Materials used; scaling without stress; effects of corrosion on high-temperature properties. Micrographs, tables, graphs, photographs. 7 ref.

10184 Liquidus of Metal-Oxide/V_2O_5 Systems. G. Lucas, M. Weddle, and A. Preece. *Iron & Steel*, v. 28, May 1955, p. 264-267.

Suggests an approach to the problem of heat-resistant alloy attack by the development of alloys which would depend on some element, other than Cr, for their oxidation resistance, or by prevention of V_2O_5 reacting with the protective oxide film. Graphs.

10185 Gas-Turbine Alloys. G. T. Harris, H. C. Child, and J. A. Kerr. *Iron & Steel*, v. 28, May 1955, p. 368-371.

Effect of the composition on resistance to scaling and to V_2O_5 attack. Graphs, tables.

10186* Resistance to Corrosion of Various Metals in Soda-Potash and Soda-Sulfate Solutions. **Korrozionnaia stoikost' razlichnykh metallov v sodo-potashnykh i sodo-sul'fatnykh rastvorakh.** (Russian.) V. G. Inzhechik and A. V. Ianush. *Khimicheskaia Promyshlennost'*, 1955, no. 1, Jan.-Feb., p. 39-42.

Laboratory and plant tests of corrosion rates; effect of temperature and covering atmospheres; comparative resistance of different steels and irons. Graphs, tables.

10187 Causes of Catalytic Corrosion. (Digest of "Catalytic Corrosion", by S. Z. Roginskii, I. I. Tret'yakov, and A. B. Shekhter; *Doklady Akademii Nauk SSSR*, v. 91, 1953, p. 881-884.) *Metal Progress*, v. 67, May 1955, p. 177-178, 180.

Investigators concluded that compound formation was the most probable cause of a high rate of catalytic corrosion and also that it would cause the metal to become a catalyst.

10188 Cathodic Protection With Zinc Anodes. (Digest of "Sound Applications for Zinc Anodes", by A. W. Peabody; presented at the Thirty-Sixth Annual Meeting of the American Zinc Institute, St. Louis, Mo., Apr. 21, 1954.) *Metal Progress*, v. 67, June 1955, p. 172, 174, 176.

Use of Zn and Mg galvanic anodes for ship protection; affect of purity of Zn anodes on their preformance in sea water.

10189* Contribution to the Problem in Intergranular Corrosion of Austentic Chromium-Nickel Steel. **Beitrag zur interkristallinen Korrosion des austenitischen Chrom-Nickel-Stahles.** (German.) Erwin Brauns and Günther Pier. *Stahl und Eisen*, v. 75, no. 9, May 5, 1955, p. 579-586; disc., p. 586.

Plotting of "current-density-potential" curves of an unstabilized stainless steel after quenching and reheating to 650 C for up to 192 hr. Diagrams, graphs, micrographs, table. 9 ref.

10190* The Development of the Cathodic Protection Against Corrosion of Metallic Constructions Under Water and in Soils. **Entwicklung des kathodischen Schutzes unterirdischer und in Gewässer versenkter metallischer Anlagen.** (German.) J. Iliovici. *Werkstoffe und Korrosion*, v. 6, no. 4, Apr. 1955, p. 181-189.

Review of equipment and methods for protection of pipelines, pile-foundations, ships, and electric cables. Table, diagrams, photographs.

10191* Corrosion Behavior of Multilayer Metallic Coatings. **Korrozionnoe povedenie mnogosloinykh metallicheskikh pokrytii.** (Russian.) V. V. Romanov. *Zhurnal Prikladnoi Khimii*, v. 28, no. 5, May 1955, p. 475-479.

Composition of electrolytes and manner of application. Electrode potentials in relation to time in solution of NaCl. Potential of Cr compared to that of Fe,Cu,Ni,Cr multilayer coating. Polarization curves. Graphs, photograph, tables, diagram. 7 ref.

10192* Effect of Temperature on the Corrosion of Metals by Chlorine. **Vliianie temperatury na korroziiu metallov khlorom.** (Russian.) Kh. L. Tseitlin. *Zhurnal Prikladnoi Khimii*, v. 28, no. 5, May 1955, p. 490-496.

Two groups of metals in terms of their resistance to dry Cl at a high temperature. Release of heat during reactions. Special resistance of Pb despite its low melting point. Effect of Cl contrasted to that of other gases. Table, graph, micrographs. 9 ref.

See also:

9981 (corrosion of petroleum refining equipment)
9996 (cathodic protection)
10142 (corrosion prevention of steel pipelines)
10169 (corrosion of Fe surfaces)
10948 (corrosion-resisting materials)

ELECTRICAL ENGINEERING

10193 Capacitor Miniaturization With Plastic Films. George Mistic. *Aero Digest*, v. 70, May 1955, p. 54, 56, 58, 60.

Problems of miniaturization, close tolerances, and operating environment of capacitor components for airborne electronic equipment are being met by use of thin dielectric plastic films. Photographs, table.

10194* **Electrical Grounding Systems and Corrosion.** L. P. Schaefer. *Applications and Industry*, 1955, no. 18, p. 75-81; disc., p. 81-83.

Considers the proper conduction of electric currents to the earth resulting in adequate grounding, and also conduction of currents through the earth resulting in corrosion or the prevention of corrosion. Diagrams, graph, table. 15 ref.

10195* An Analytical Method for the Design of Relay Servomechanisms. John E. Hart. *Applications and Industry*, 1955, no. 18, p. 83-89; disc., p. 89-90.

Includes diagrams, graphs, table. 3 ref.

10196* Time Variation of Industrial System Short-Circuit Currents and Induction Motor Contributions. W. C. Huening, Jr. *Applications and Industry*, 1955, no. 18, p. 90-99; disc., p. 99-101.

Method used to determine the approximate short-circuit current time variation, and a discussion of the behavior of induction motors which produce short-circuit current contributions that do not decay rapidly. Graphs, tables, diagrams. 5 ref.

10197* Underground Corrosion on Rural Electric Distribution Lines. O. W. Zastrow. *Applications and Industry*, 1955, no. 18, p. 101-108; disc., p. 108-109.

Studies of corrosion associated with the grounding of multiground wye-connected distribution lines. Map, graphs, diagrams, photograph, table.

10198* Design and Application of a Peak Voltage Detector to Industrial Control Systems. Lloyd W. Allen. *Applications and Industry*, 1955, no. 18, p. 123-128; disc., p. 128.

Describes in detail control portion of an industrial type servo system. Diagrams, graphs, table. 5 ref.

10199* Metallurgical Research in the Electrical Industry. Ivor Jenkins. *Birmingham Metallurgical Society, Journal*, v. 35, Mar. 1955, p. 151-168.

Discusses role of research in the industry. Photographs.

10200 Phenomena Accompanying Transient Low-Voltage Discharges in Liquid Dielectrics. I. Anode Phenomena at Low Currents. E. M. Williams and R. E. Smith. *Communication and Electronics*, 1955, no. 18, May, p. 164-169.

Includes tables, diagrams, graphs. 6 ref.

10201 Rapid Measurement of Impedance and Admittance. B. Salzberg and J. W. Marini. *Communication and Electronics*, 1955, no. 18, May, p. 180-186.

Method is described for direct, rapid, and simultaneous measurement of the real and quadrature components of a driving-point or transfer impedance and admittance over a wide and continuous range of frequency. Diagrams. 8 ref.

10202 A Novel Circuit for Electronic Power-Factor Meters and Wattmeters, and a Novel Division Device. M. Abdel-Halim Ahmed. *Communication and Electronics*, 1955, no. 18, May, p. 194-203; disc., p. 203-204.

Three electronic measuring instruments are presented, which may be used to measure power, power factor, voltage, current, or impedance. Diagrams, graphs. 13 ref.

10203* Propagation of Basic Wave Between Parallel Surfaces. **O rasprostranenii osnovnoi volny mezhdu parallel'nymi poverkhnostiami.** (Russian.) E. Burshtein and L. Solov'ev. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 465-468.

Mathematical determination of phase speed. 3 ref.

10204* Let's Look to Station Grounding. Stephen J. Schwarz. *Electrical World*, v. 143, May 2, 1955, p. 55-58.

Mathematical analysis guides cost comparison of ground grid configurations. Graphs, photograph.

10205* All-Steel Network Grounds Substation. Glen Appleman and S. J. Litrides. *Electrical World*, v. 143, May 2, 1955, p. 59-61.

Details and advantages of all-steel grounding system. Diagrams, photographs.

10206* Hosensack Tests Prove Steel Ground Grid Works Well. W. F. Dunkle. *Electrical World*, v. 143, May 2, 1955, p. 62-65.

Formulas for determining soil resistivity and resistance of different shaped grounding electrodes at various depths. Measurements show voltage rise in non-Cu grounding network would remain well within limits of the installed 4-kv. protective neutralizing facilities. Graphs, tables, diagrams, reference sheet. 1 ref.

10207* Safety and Fire Protection in Central Stations. G. F. Briner. *Electric Light and Power*, v. 33, May 1955, p. 98-102.

Provisions follow basic rules, although interpretation may vary. Photographs, table, diagram.

10208* Impedance Testing of Synchronous-Machine Rotor Windings. William Schneider. *Electric Light and Power*, v. 33, May, 1955, p. 106-110.

Effects of short circuits; theory of test method. Graphs, photographs, diagrams. 2 ref.

10209 Capacitive Transducer Has Low Impedance. Henry P. Kalmus. *Electronics*, v. 28, June 1955, p. 161-163.

Low-capacitance rectifier integral with assembly provides tranducer with low-impedance output and high signal-noise ratio. Photographs, circuit diagrams.

10210* A New 110-Kv. Oil Disconnector Switch. **Novyi malomaslianyi vykliuchatel' 110 kv.** (Russian.) V. B. Gurvich and V. V. Kaplan. *Elektricheski Stantsii*, v. 26, no. 4, Apr. 1955, p. 34-38.

Design, principle of operation, test results, installation, and use. Diagrams.

10211* Steadiness of Regulation of Excitation by an Electromagnetic Voltage Corrector. **Ob ustoichivosti regulirovaniia vozbuzhdeniia elektromagnitnym korrektorom napriazheniia.** (Russian.) E. S. Lukashov. *Elektricheskie Stantsii*, v. 26, no. 5, May 1955, p. 31-33.

Automatic control of excitation of synchronous machines. Graphs.

10212* Characteristics and Calculation of Electromagnetic Couplings With Ferromagnetic Filler. **Kharakteristiki i raschet eletromagnitnykh muft s ferromagnitnym napolnitelem.** (Russian.) G. M. Petukhin. *Elektrichestvo*, 1955, no. 3, Mar., p. 10-16.

Includes diagrams, graphs, circuit diagrams.

10213* Effect of Humidity on the Electrical Characteristics of Insulation Rubber. **Vliiane uvlazhneniia na elektricheskie kharakteristiki izoliatsionnoi reziny.** (Russian.) S. M. Bragin and M. M. Markosian. *Elektrichestvo*, 1955, no. 3, Mar., p. 54-57.

Dielectric penetrability of vulcanized rubbers; relation of disruptive voltages and time of humidification. Graphs, tables. 4 ref.

10214* General Behavior Patterns of Thermal Aging of Polymer Dielectrics. **Obshchie zakonomernosti teplovogo stareniia polimernykh dielektrikov.** (Russian.) V. I. Kalitvianskii. *Elektrichestvo*, 1955, no. 3, Mar., p. 57-61.

Includes graphs. 4 ref.

10215* Contact Materials on Silver Base With Special Consideration to Their Heat Treatment. **Kontaktwerkstoffe auf Silberbasis unter besonderer Berücksichtigung ihrer thermischen Vergütung.** (German.) W. Rienäcker, H. Spengler, and H. Dittler. *Elektro-Post*, v. 8, no. 10, Apr. 8, 1955, p. 157-160.

Hardness and other properties of Ag and Ag alloys as a function of degree of deformation and heat treatment. Tables, graphs. 15 ref.

10216* Method for the Determination of Additional Load. **Verfahren zur Ermittlung der Zusatzlast.** (German.) Heinz Mors. *Elektrotechnische Zeitschrift*, v. 76. Ausgabe A, no. 8, Apr. 1955, p. 282-285.

A new general formula applicable to any cross section of an electric transmission line. Tables, graphs. 13 ref.

10217 100-MVA Reactor Controlled by Direct Current. F. J. Fisher and E. Friedlander. *Engineering*, v. 179, May 20, 1955, p. 633-636.

Electrical Engineering

Essential requirements; construction; electric circuit; mechanical arrangement; loss requirements; compensation of harmonics; voltage and current characteristics; noise level; speed of response; fields of application. Photographs, diagram, graphs.

10218 Theory of the Purely Electrical Breakdown of Solid Insulators. **Theorie des rein elektrischen Durchschlags fester Isolatoren.** (German.) Walter Franz. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 1-55. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Chapters on the theory of electronic transitions in crystals; theory of intrinsic field emission; computation of the electronic state in the conduction band and of the total electron distribution; growth of the electric current and breakdown; and application on specific materials. Graphs, diagrams. 60 ref.

10219* Electrical Methods of Measuring Vibrations and Frequency Analysis at Very Low Frequencies. **Elektrische Methoden zur Schwingungsmessung und Frequenzanalyse bei sehr tiefen Frequenzen.** (German.) W. Mühe. *Frequenz*, v. 9, no. 5, May 1955, p. 146-157.

Includes diagrams, photographs, graphs. 16 ref.

10220* Contributions to the Problem of Negative Feedback. **Beiträge zum Problem der Gegenkopplung.** (German.) Hermann Haller. *Frequenz*, v. 9, no. 5, May 1955, p. 164-172.

Principles and circuits; Bode's, Duerdoth's, and Bader's methods; determination of transmitting properties. Diagrams, graphs. (To be continued.)

10221 The Effective Leakage Resistance of Several Types of Capacitors. R. W. Tucker and S. D. Breskend. *Institute of Radio Engineers, Transactions on Component Parts*, PGCP-3, Apr. 1955, p. 3-9. (TK1 In6.6cp)

Based on a rate-of charge principle, for leakage resistance measurement and change in capacitance with time of applied voltage, the method yields rapid and direct results. A polytetrafluorethylene capacitor displayed the best d.c. properties. Graphs, circuit diagram.

10222 Transformer Design Chart. Reuben Lee and N. E. Mullinix. *Institute of Radio Engineers, Transactions on Component Parts*, PGCP-3, Apr. 1955, p. 10-14. (TK1 In6.6cp)

Describes a chart by which the design of two winding, 60 cycle, low-voltage transformers can be made without most of the time-consuming design procedures. Tables, chart.

10223 Methods for Locating Faults on Electrical Cables. Mount Fitzpatrick. *Iron and Steel Engineer*, v. 32, May 1955, p. 77-87.

Includes diagrams.

10224 Diffusion, Static Charges, and the Conduction of Electricity in Nonmetallic Solids by a Single Charge Carrier. II. Solution of the Rectifier Equations for Insulating Layers. Selby M. Skinner. *Journal of Applied Physics*, v. 26, May 1955, p. 509-518.

Includes graphs, table. 10 ref.

10225 Arcing at Electrical Contacts on Closure. VI. The Anode Mechanism of Extremely Short Arcs. W. S. Boyle and L. H. Germer. *Journal of Applied Physics*, v. 26, May 1955, p. 571-574.

Includes graph, diagram, micrographs, tables. 4 ref.

10226* Forced Water Cooling of Large Transformers. **Gedwongen waterkoeling voor grote transformatoren.** (Dutch.) H. Wiersma. *Smit Mededelingen*, v. 10, no. 1, Jan.-Mar. 1955, p. 15-25.

Includes table, diagrams, photographs, graphs.

10227* Temperature and Current Density at the Cathode of Heavy-Current Carbon Arcs. **Über Temperatur und Stromdichte an der Kathode von Hochstromkohlebögen.** (German.) P. Guillery. *Zeitschrift für Naturforschung*, v. 10a, no. 3, Mar. 1955, p. 248-249.

Factors attributing to the unstable behavior of electric carbon arcs when the current exceeds 400 amp. Diagram, graphs. 1 ref.

See also:

10386 (electrical systems in refineries)
10661 (electric drives for rolling mills)
10887 (electric breakdown of insulators)
10931 (dielectric losses of polyethylene)
10932 (dielectric losses of polyisobutylene)

ELECTROCHEMISTRY AND ELECTROPROCESSES

10228* **Gaging of Plating Thickness Points to Automatic Inspection.** *Automation*, v. 2, June 1955, p. 57-60.

Three new gages point to automatic inspection and process control applications. Photographs, diagrams.

10229 The Electrical Conductance of Strong Electrolytes: A Test of Stokes' Equation. A. N. Campbell and E. M. Kartzmark. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 887-894.

Stokes' equation, based entirely on theory and physical quantities, shows excellent agreement at 3*N* to 5*N* concentrations. Tables, graphs. 10 ref.

10230 Cystine as an Addition Agent in the Electrodeposition of Copper. A. J. Sukava and C. A. Winkler. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 961-970.

Cystine gave polarization-time curves similar to those of gelatine. Graphs. 13 ref.

10231 Anodic Syntheses. XIII. Chain Extension of Fatty Acids by Electrolysis With Benzyl Half Esters. R. P. Linstead, B. C. L. Weedon, and B. Wladislaw. *Chemical Society, Journal*, 1955, Apr., p. 1097-1100.

Benzyl hydrogen succinate was used; natural eicos-11-enoic acid suggests *cis*-arrangement. 27 ref.

10232 The Conductivity of Silver Nitrate in Non-Aqueous and Mixed Solvents. II. V. S. Griffiths and K. S. Lawrence. *Chemical Society, Journal*, 1955, Apr., p. 1208-1212.

Determined in dioxane-water, acetone, and acetone-water media. Table. 38 ref.

10233* Electric Properties of Alkaline Metal Solutions in Liquid Ammonia: Wien's Effect. **Propriétés électriques des solutions de métaux alcalins dans l'ammoniac liquide: l'effet Wien.** (French.) Gérard Lepoutre and Andrew Patterson, Jr. *Comptes rendus*, v. 240, no. 16, Apr. 18, 1955, p. 1644-1646.

Interpretation of Wien's effect. Tables. 4 ref.

10234 Automation in the Plating Industry. H. Silman. *Electroplating and Metal Finishing*, v. 8, May 1955, p. 184-189.

Principles of mechanization in electroplating; compares through-type and return-type machines; instrumentation and automatic control systems. Photographs, diagrams. 12 ref.

10235* **Electroplating of Precious Metals.** S. W. Baier. *Industrial Finishing (London)*, v. 8, Apr. 1955, p. 203-209.

Reviews processes in use today for electroplating Ag, Au, Rh, Pd, and Pt and recent modifications. Tables, photographs. 16 ref.

10236 Anodized Coatings: What They Are—How They Behave. I. C. C. Cohn. *Iron Age*, v. 175, May 26, 1955, p. 91-94.

Film which improves Al surfaces as to corrosion protection, insulation value, rectifier effect, color-ability, paint-base, abrasion resistance, electroplating base, printing base, and other properties. Diagram, photographs. (To be continued.)

10237* **Standardization of Chromium Bath Tests on a Bent Cathode in the Hull Cell. I. Development and Standardization of a Method to Evaluate Covering Power.** Robert H. Rousselot. *Metal Finishing*, v. 53, May 1955, p. 50-53, 55.

Standardization of test is limited to establishing the angle of bend, the fillet radius of the apex, total current, and duration; quantitative determination of covering power. Diagrams, graphs, table. (To be continued.)

10238* **Spotting-Out and Staining on Plated Work.** G. B. Hogaboom, Jr. *Metal Finishing*, v. 53, May 1955, p. 54-55.

Discussion of causes of spotting that originate in the preparation of an article before plating. Photograph.

10239* **Complex Ions in Chromium Plating Solutions.** Gunnar Gabrielson. *Metal Finishing*, v. 53, May 1955, p. 56-58.

Use of ion exchangers in the analysis of Cr plating baths in order to remove interfering ions. Tables. 23 ref.

10240* **Plating Bath Control: Past, Present and Future.** Joseph B. Kushner. *Metal Finishing*, v. 53, May 1955, p. 59-63.

Discussion of control of temperature, agitation, time, electrical energy, and composition in plating baths. Diagrams.

10241 **Modern Electroplating Plant.** W. H. Simons. *Metal Industry*, v. 86, Apr. 29, 1955, p. 333-338.

Indications of the trend of progress in the metal finishing field. Photographs.

10242* Electrolytic Deposition of Lead-Tin Alloy. **Die galvanische Abscheidung von Blei-Zinn-Legierungen.** (German.) Ernst Raub and Walter Blum. *Metalloberfläche*, v. 9, no. 4, Apr. 1955, p. 54A-57A.

Relation of plating conditions, bath composition, and temperature to composition of the deposits. Tables, graphs. 7 ref.

10243 **Electroplating on Aluminum.** R. F. Hafer. *Metal Progress*, v. 67, May 1955, p. 93-97.

Careful surface preparation is needed to obtain sound and adherent electrodeposits. Photographs, table.

10244* **Chromium Plating of Engine Cylinders Can Slash Wear Rates, Up Economy.** Russell Pyles. *Power*, v. 99, June 1955, p. 132-133.

Porous Cr is produced by electrolytic or chemical action on Cr plate on a smooth honed bore. Photograph, micrographs.

10245 **Tin Plating of Copper Wire.** C. Fred Gurnham. *Products Finishing*, v. 19, May 1955, p. 56 + 5 pages.

Stannous fluoborate plating has many advantages over hot-dip process. Photograph.

10246 **Surface Treatment and Finishing of Light Metals. XI.** S. Wernick and R. Pinner. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 345-356, 372.

Discusses production, cooling, properties, adhesion, corrosion resistance, and applications. Graphs, diagrams, micrographs, tables. 17 ref.

10247 **Electrochemical Studies of Non-Aqueous Melts.** R. F. Mehl and G. Derge. *U. S. Atomic Energy Commission, NYO-6618*, May 1955, 6 p. (UF767 U3ny)

Conductivity of sulfides; self-diffusion of Fe in molten C-saturated Fe; electrolysis of molten MnO-FeO-SiO_2 slags. Tables.

10248* Mechanism of the Effect of Alternating Current on the Structure of Copper Deposits. **O mekhanizme vliianiia peremennogo toka na stroenie osadkov medi.** (Russian.) K. M. Gorbunova and A. A. Sutiagina. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 3, Mar. 1955, p. 542-546.

Depending on amplitude, application of alternating current causes a smoothing of the surface of the deposit and the formation of friable, flocculent fine-crystal deposits. Oscillograms, micrographs. 9 ref.

10249* Hydrogen Yield With Respect to Current and the Cathode Potentials During the Electrolysis of Zinc Sulfate Solutions in the Presence of Ions of Metals More Electropositive Than Zinc. **Vykhod po toku i katodnye potentsialy pri elektrolize rastvorov sernokislogo tsinka v prisutstvii ionov metallov, bolee elektropolozhitel'nykh, chem tsink.** (Russian.) U. F. Turomshina and V. V. Stender. *Zhurnal Prikladnoi Khimii*, v. 28, no. 4, Apr. 1955, p. 372-387.

Includes graphs. 41 ref.

10250* Problem of Obtaining High-Quality Galvanic Coatings on Parts Made of Zinc Alloys. **K voprosu o poluchenii kachestvennykh gal'vanicheskikh pokrytii na izdeliiakh iz tsinkovykh splavov.** (Russian.) G. S. Vozdvizhenskii, V. A. Dmitriev, A. G. Mozhanova, E. V. Rzhevskaia, and D. E. Chasov. *Zhurnal Prikladnoi Khimii*, v. 28, no. 5, May 1955, p. 484-489.

Effect on coatings of pores and slag inclusions in the castings. Proper cyanide content, temperature, and pH for Cu plating. Photographs, tables. 6 ref.

See also:

10191 (corrosion of electroplate)

ELECTRONICS

10251* **Analysis of Errors in Sampled-Data Feedback Systems.** Jack Sklansky and J. R. Ragazzini. *Applications and Industry*, 1955, no. 18, p. 65-71.

Includes diagrams, graphs. 8 ref.

10252* **A Method for Evaluating Nonlinear Servomechanisms.** M. V. Mathews. *Applications and Industry*, 1955, no. 18, p. 114-122; disc., p. 122.

Method determines a valid mathematical description of a class of non-linear servomechanisms from measurements of the servo response to a set of input signals. Graphs, tables, diagrams. 9 ref.

10253* **The Influence of the Space Charge in an Electron Beam Accelerated in a Constant Electrostatic Field Up to Energies of Several MeV.** M. Sangster. *Applied Scientific Research*, v. 4, sec. B, no. 4, 1955, p. 261-270.

Includes graphs. 6 ref.

10254 **Transmission of Digital Information Over Telephone Circuits.** A. W. Horton, Jr. and H. E. Vaughan. *Bell System Technical Journal*, v. 34, May 1955, p. 511-528.

Limitations imposed by the characteristics of circuits and their influence on choice of a signaling method. Tables, graphs, diagrams. 4 ref.

10255 **Optimum Design of Directive Antenna Arrays Subject to Random Variations.** E. N. Gilbert and S. P. Morgan. *Bell System Technical Journal*, v. 34, May 1955, p. 637-663.

Statistical formulation; criteria for good patterns; restrictions on super directive arrays; optimum designs taking account of finite precision; symmetric arrays; numerical examples. Tables, graphs. 7 ref.

10256 **Low-Frequency Dynamic Response of Photosensitive Neon Discharge Tubes.** T. J. Dillon. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 138-140.

Theoretical outline of the effect of periodic variations on sawtooth oscillations and its application to the oscillation of tubes illuminated by sources giving a light output of rectified sinusoidal waveform.

10257 **A Two-State Light Activated Circuit Element Using Germanium.** J. W. Granville. *British Journal of Applied Physics*, v. 6, May 1955, p. 172-173.

A Ge photo-switch with two stable states is described, each state being set by illumination of one or the other of two small Ge bars. Diagrams, graphs. 1 ref.

10258 **A Tapered Strip Transmission Line for Pulse Transformer Service.** F. G. Primozich, E. R. Schatz, and J. B. Woodford. *Communication and Electronics*, 1955, no 18, May, p. 158-160.

Comparisons of rectangular, exponential, and tapered strip lines for efficiency, size, and fabrication economics. Graph, diagrams, photograph. 19 ref.

10259* **Thyratrons for Industrial Control.** *Communications and Electronics*, v. 2, June 1955, p. 64-68.

Use of shield grids; selection of thyratrons; motor control applications; resistance welding control; regulation of power supplies; thyratron inverters; miscellaneous applications. Diagrams, tables, photographs.

10260* **Microwave Components and Measuring Instruments. II.** P. K. Worsley. *Communications and Electronics*, v. 2, June 1955, p. 73-78.

Survey of accessories and components in microwave equipment. Photographs, tables.

Electronics

10261* Localization of Generation Phenomena of Recombination in Contact Barriers and on the Semiconductor Surface. **Considérations sur la localisation des phénomènes de génération et de recombinaison dans les barrières de contact et à la surface d'un semi-conducteur.** (French.) Nicolas Nifontoff. *Comptes rendus*, v. 240, no. 16, Apr. 18, 1955, p. 1634-1636.

Studies at contact points and in the center of *p-n* junctions. Diagrams. 8 ref.

10262 A Time-Delay Device Using Transistors. G. F. Pittman, Jr. *Electrical Engineering*, v. 74, June 1955, p. 498-501.

Time-delay devices that perform pulse-shaping and pulse-counting functions now use junction transistors and rectangular hysteresis-loop magnetic cores for reliable operation over wide temperature ranges and voltage variations. Circuit diagrams. 1 ref.

10263 The Display of Transformer Magnetizing Ampere-Turns on a Cathode-Ray Oscilloscope. M. E. Bond. *Electronic Engineering*, v. 27, May 1955, p. 218-219.

Application of method to the line output transformer of a television receiver. Circuit diagrams, graph.

10264 Directly Coupled Transistor Circuits. Ralph H. Beter, William E. Bradley, Ralph B. Brown, and Morris Rubinoff. *Electronics*, v. 28, June 1955, p. 132-136.

Computer circuits designed to take advantage of surface barrier and certain alloy-junction transistors reduce considerably the number of capacitors and resistors required for operation. Photograph, diagrams, graphs, circuit diagrams.

10265 Waveform Generator Uses Pulse Techniques. E. E. Newhall. *Electronics*, v. 28, June 1955, p. 149-151.

Flying-spot scanner type of function generator for use with analog computers is made insensitive to phototube output level or drift in the d.c. amplifiers by a pulse-sampling technique that uses the phototube only as an indicator, making its output level relatively unimportant. Diagrams, circuit diagram. 1 ref.

10266 Antenna System for Missile Telemetering. Garth E. Bower and James B. Wynn, Jr. *Electronics*, v. 28, June 1955, p. 164-167.

Dual helical antennas, low-noise preamplifier and multi-coupler form antenna system for receiving signals telemetered from guided missiles. Photographs, diagrams, table, circuit diagrams.

10267* Measurement of the Parameters and the Calculation of Selenium Rectifiers. **K izmereniu parametrov i raschetu selenovykh vypriamitelei.** (Russian.) I. I. Ratgaus. *Elektrichestvo*, 1955, no. 3, Mar., p. 36-40.

Data presented for rectifiers, and volt-amperage characteristics. Graphs, circuit diagrams. 1 ref.

10268 The Conduction Mechanism of Homopolar Semiconductors. **Der Leitungsmechanismus in homöopolaren Halbleitern.** (German.) Otfried Madelung. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 56-124. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Review of the literature on the general model of a semiconductor; semiconductors with homogeneous impurity scattering; contacts; and semiconductors with inhomogeneous impurity scattering. Graphs, diagrams, table. 182 ref.

10269 Field Emission. **Feldemission.** (German.) Erwin W. Müller. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 290-360. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Review of electron emission produced by high field intensities; field-emission microscopy, and its various uses in the field of scientific research. Graphs, diagrams, tables, micrographs. 139 ref.

10270* Building-Up Behavior of Band Filters. **Einschwingverhalten von Bandfiltern.** (German.) F. Baur. *Frequenz*, v. 9, no. 5, May 1955, p. 141-146.

Process of obtaining transients, based on the eigen values of a wave filter and building-up phenomena by amount and phase for any multicircuit band filter. Diagrams, graphs. 2 ref.

10271* A New Method of Designing Linear Quadripoles. **Eine neue Methode zur Bearbeitung linearer Vierpole.** (German.) Johann de Buhr. *FTZ; Fernmeldetechnische Zeitschrift*, v. 8, no. 4, Apr. 1955, p. 200-204.

Impedance transformations, introduced by four-terminal networks, are represented by movements on the surface of a sphere. The present graphical or diagrammatical methods are made accessible to a purely geometrical teratment by means of the projection method. Diagrams. 10 ref.

10272* Linear Properties of Transistors. **Lineare Eigenschaften des Transistors.** (German.) G. Ledig. *FTZ; Fernmeldetechnische Zeitschrift*, v. 8, no. 4, Apr. 1955, p. 221-228.

Equations are derived which describe the properties of various transistor circuits. Diagrams, tables, graphs. 1 ref.

10273 A New Self-Oscillating Frequency Converter. David F. Sunstein. *Institute of Radio Engineers, Transactions on Broadcast and Television Receivers*, v. 1, Jan. 1955, p. 29-35. (TK1 In6.6b)

Includes circuit diagrams, graphs.

10274 Problems Encountered and Procedures for Obtaining Short-Term Life Ratings on Resistors. W. T. Sackett, Jr. *Institute of Radio Engineers, Transactions on Component Parts*, PGCP-3, Apr. 1955, p. 15-29. (TK1 In6.6cp)

Abberviated review of Battelle's activities in the electronic-component field, with a detailed discussion of the development of procedures for obtaining short-term life ratings on components. Graphs.

10275 Subminiature Transformers and Their Application to Junction-Transistor Circuits. E. F. Dunkin and D. L. Johnston. *Institute of Radio Engineers, Transactions on Component Parts*, PGCP-3, Apr. 1955, p. 30-44. (TK1 In6.6cp)

Technical limitations and design features of subminiature audio, control frequency transformers, and inductors. Graphs, tables, photographs, digrams.

10276 Recent Developments in Power Transistors. H. T. Mooers. *Institute of Radio Engineers, Transactions on Electron Devices*, v. 2, Jan. 1955, p. 63-73. (TK1 In6.6ed)

Temperature power relationship; theoretical size requirements for a heat dissipator for free air and forced convection. Diagram, tables, graphs.

10277 Recent Developments in Silicon Fusion Transistors. R. A. Gudmundsen, W. P. Waters, A. L. Wannlund, and W. V. Wright. *Institute of Radio Engineers, Transactions on Electron Devices*, v. 2, Jan. 1955, p. 74-81. (TK1 In6.6ed)

Advantages and principles of Sn-Si and Au-Si fusion junctions. Graphs, photographs, micrographs.

10278 "Gate Modulation" of Electromagnetic Radiation. Kurt Lehovec. *Journal of Applied Physics*, v. 26, May 1955, p. 495-496.

Principle; theory, relation between radiation modulation and transistors. Table, diagram. 7 ref.

10279 Noise in One-Dimensional Electron Beams. Hermann A. Haus. *Journal of Applied Physics*, v. 26, May 1955, p. 560-571.

Includes diagrams, graph. 11 ref.

10280 Multiple Coincidence Magnetic Storage Systems. Robert C. Minnick and Robert L. Ashenhurst. *Journal of Applied Physics*, v. 26, May 1955, p. 575-579.

Includes photographs, diagrams. 13 ref.

10281 Role of Positive Ions in High-Voltage Breakdown in Vacuum. H. C. Bourne, Jr., R. W. Cloud, and J. G. Trump. *Journal of Applied Physics*, v. 26, May 1955, p. 596-599.

Influence of cathode gradient; effect of target material and of the positive ion and its angle of incidence; positive ions in vacuum breakdown. Graphs, diagram. 5 ref.

10282* Impulse Measurements in a Rheostatic Amplifier. **Impul'snye izmereniia v reostatnom usilitele.** (Russian.) N. A. Smurova and G. I. Makarov. *Leningradskogo, Universiteta, Vestnik, Seriia Matematiki, Fiziki i Khimii*, v. 10, no. 2, Feb. 1955, p. 107-124.

Methods of determining time constants. Graphs, tables, diagrams, oscillograms. 1 ref.

10283 The Cold-Cathode Gas Diode. *National Bureau of Standards, Technical News Bulletin*, v. 39, May 1955, p. 61-64.

Special circuits and improved voltage characteristics may make this component useful in computers. Circuit diagrams.

10284 Electronics for Ordnance. C. M. Hudson. *Ordnance*, v. 39, May-June 1955, p. 1007-1009.

Applications of electrons to the field of weapons are increasing rapidly. Photographs.

10285 The Effect of Discontinuous Space Charge on Rectifier Characteristics. G. G. Wiles. *Philosophical Magazine*, v. 46, 7th ser., no. 375, Apr. 1955, p. 363-375.

Includes tables, diagrams. 6 ref.

10286 Thermal Acceptors in Germanium. R. J. Hodgkinson. *Philosophical Magazine*, v. 46, 7th ser., no. 375, Apr. 1955, p. 410-421.

Experimental work; theory. Graphs. 16 ref.

10287 Carrier Concentration Disturbances in Semiconductors. G. G. E. Low. *Physical Society, Proceedings*, v. 68, no. 425B, May 1955, p. 310-314.

Discussion of carrier injection, exclusion, extraction, and accumulation in terms of a unified set of equations. Diagram. 7 ref.

10288 Midget Transistorized Signal Injector. Elliott A. McCready. *Radio-Electronics*, v. 26, June 1955, p. 63-64.

Method of spotting a defective stage in a radio receiver or audio amplifier. Diagram, photograph, oscillogram.

10289* Theory of Thermal Noises. **Teoriia teplovykh shumov. II.** (Russian.) S. M. Rytov. *Radiotekhnika*, v. 10, no. 3, Mar. 1955, p. 3-13.

Includes diagram. 12 ref.

10290* Piezoelectrical Filter of Upper Frequencies. **P'ezoelektricheskii fil'tr verkhnikh chastot.** (Russian.) Ia. I. Velikin, Z. Ia. Gel'mont, and E. V. Zeliakh. *Radiotekhnika*, v. 10, no. 3, Mar. 1955, p. 41-49.

Theory and method of calculating elements of one filter type. Calculation of damping. Graph, diagrams. 2 ref.

10291* A Bandpass R. F. Power Amplifier. Richard Graham. *Radio & Television News*, v. 53, June 1955, p. 52-54, 113.

Details on a unique unit which permits operation over an entire amateur band without need for tuning adjustments. Diagrams, circuit diagrams, photographs.

10292* Use of Semi-Conductors in Thermoelectric Generators. H. J. Goldsmid. *Research*, v. 8, May 1955, p. 172-177.

Indicates how production of electricity from thermocouples on an appreciable scale might be achieved. Graphs, diagrams. 11 ref.

10293 Floating-Decimal Matrix Inversion. F. M. Trantham, Jr. *U. S. Atomic Energy Commission*, DP-101, Apr. 1955, 42 p. (UF767 Un3.1dp)

Method of matrix inversion is adapted to the Heising Floating-Decimal General-Purpose Board for an IBM Card-Programmed Electronic Calculator. Tables, diagrams, graphs. 4 ref.

10294* Electrical Fluctuations and Thermal Radiation. **Elektricheskie fluktuatsii i teplovoe izluchenie.** (Russian.) S. M. Rytov. *Uspekhi Fizicheskikh Nauk*, v. 60, no. 3, Mar. 1955, p. 299-314.

Survey of theories on thermal noise, including Nyquist's spectral theory, etc. 13 ref.

10295* Junction-Transistor Trigger Circuits. J. E. Flood. *Wireless Engineer*, v. 32, May 1955, p. 122-130.

Includes graphs, diagrams, micrographs. 17 ref.

10296* Rectifier With *p-i-n* or With *p-s-n* Structure Charged With Direct Current. **Gleichrichter mit *p-i-n-* bzw. mit *p-s-n*-Struktur unter Gleichstrombelastung.** (German.) Adolf Herlet and Eberhard Spenke. *Zeitschrift für angewandte Physik*, v. 7, no. 3, Mar. 1955, p. 149-163.

Mathematical analysis of semiconductors. Graphs. (To be continued.)

10297* Ionic Bond in Chemical Adsorption on Semiconductors. **O ionnoi sviazi pri khimecheskoi adsorbtsii na poluprovodnikakh.** (Russian.) F. F. Vol'kenshtein and S. Z. Roginskii. *Zhurnal Fizicheskoi Khimii*, v. 29, no. 3, Mar. 1955, p. 485-495.

Acceptor-donor properties of adsorbed atom; transition phenomena; equilibrium between different bond forms. Graphs, diagrams. 8 ref.

10298* Method of Determining the Mobility of the "Nonbasic" Current Carriers Injected by Light. **Metod opredeleniia podvizhnosti "neosnovnykh" nositelei toka, in'ektirovannykh svetom.** (Russian.) S. M. Ryvkin and R. V. Khar'iuzov. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 563-568.

Studies of photoconductive semiconductors. Circuit diagrams, graphs, oscillograms. 7 ref.

10299* Round and Rectangular Wave Guides With Longitudinal Diaphragms. **Kruglyi i priamougol'nyi volnovody s prodol'nymi diafragmami.** (Russian.) E. G. Solov'ev. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 707-710.

Electrical field approximated with respect to traveling wave law. Dispersion equations. Graphs, diagram. 1 ref.

10300* Diffusion of Tin and Antimony in Semiconductor Compounds of Bi_2Se_3 and Bi_2Te_3. **O diffuzii olova i sur'my v poluprovodnikovykh soedineniiakh Bi_2Se_3 and Bi_2Te_3.** (Russian.) B. Boltaks. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 767-768.

Measurement of coefficients of diffusion, in various temperature ranges, by radioactive isotopes and the absorption method. Graphs. 4 ref.

Books and Miscellaneous Publications

10301 Problems of Semiconductors. **Halbleiterprobleme.** (German.) Walter Schottky, editor. v. I. 387 p. 1954. Friedr. Vieweg & Sohn, Braunschweig. (TK3376 Sch67h)

Contributions by 15 authors covering the theory of semiconductors, chemical bonds in semiconducting solid bodies, regulation of electric and optical properties of polar crystals, properties, and preparation of Se and Cu oxide rectifiers, transistors, and photoconductivity.

See also:

9942 (glass parts for electronic equipment)
10347 (electronic computers for color printing)
10792 (impulse amplifiers)
10887 (semiconductor conduction mechanisms

ENGINEERING ECONOMICS

10302 Needs for Atomic Industry, 1964. *Chemical and Engineering News*, v. 33, May 30, 1955, p. 2284-2285.

Projected needs for manpower, materials, and finances. Graphs.

10303 Know-How Economics. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 982-994.

Symposium of four papers covering costs of acqusition and application of "know-how" (defined as overall knowledge of a material or process through its commercial success), by direct development, through licensing, and market development costs. Tables, graphs, diagram. 14 ref.

10304* The Paint Industry in Great Britain. A. L. Minkes. *Journal of Industrial Economics*, v. 3, no. 2, Apr. 1955, p. 144-170.

A study in technical change, market forms, and size of firms. Tables, graph. 21 ref.

Engineering Economics

10305* The Application of Aerial Survey Methods to Economic Development. *Mining Journal*, v. 244, Apr. 15, 1955, p. 415-416.

Value of aerial surveying; land planning; surveying for minerals. Photographs.

10306* Progress Committee Report. Charles R. Daily. *Society of Motion Picture and Television Engineers, Journal*, v. 64, May 1955, p. 225-247.

Developments during 1954 in fields of television, moving pictures, photography, and sound recording and reproduction. Photographs, diagrams, maps. 119 ref.

Books and Miscellaneous Publications

10307 Marketing Research and Management. A. G. Irvine. 275 p. 1954. MacDonald & Evans, London. (HF5415 Ir8m)

Defines the scope of marketing research on a factual basis; general procedure in any marketing research inquiry; three of the more widely used techniques; relationship of marketing research to management and the application of management to this particular field.

See also:

9977 (cost factors of filter presses)
10967 (markets for acrylic fibers)

FLUID MECHANICS

10308 Correcting Gas Volumes to Standard Conditions. Charles R. Noddings and Robert M. Lawless. *Chemical Processing*, v. 18, May 1955, p. 200, 202.

Nomograph for determining or checking NTP values.

10309* On the Derivation of the Equations of Hydrodynamics From Statistical Mechanics. Charles B. Morrey, Jr. *Communications on Pure and Applied Mathematics*, v. 8, May 1955, p. 279-326.

4 ref.

10310 Isothermal Skin Friction in Flow Through Annular Sections. R. R. Rothfus, C. C. Monrad, K. G. Sikchi, and W. J. Heideger. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 913-918.

Most data are from air and water systems at room temperature. Tables, graphs, diagram. 13 ref.

10311* The Measurement of Flow With Density Compensation as Applied to Liquids and Gases. Henry W. Stoll. *ISA Journal*, v. 2, May 1955, p. 159-162.

Functional requirements of the flow measuring instrument so that its indication is a true measure of mass transfer rate. Diagrams, graphs.

10312 The Effect of a Surrounding Fluid on Pressure Waves in a Fluid-Filled Elastic Tube. M. C. Junger. *Journal of Applied Mechanics*, v. 22, June 1955, p. 227-231.

Phenomena in fluid column; dynamics of tube; characteristic equation; quasi-plane wave; inadequacy of membrane theory. Graphs. 8 ref.

10313 Equivalent-Radius Method for Determination of Non-Newtonian Flow Curves From Viscometric Data. K. H. Cram and J. C. Whitwell. *Journal of Applied Physics*, v. 26, May 1955, p. 613-618.

Includes graphs. 15 ref.

10314 Thermal Diffusion and Molecular Motion in Liquids. E. L. Dougherty, Jr. and H. G. Drickamer. *Journal of Physical Chemistry*, v. 59, May 1955, p. 443-449.

Prediction of separation from mol. wt. and vol., activation energies for viscous flow, and excess thermodynamic properties. Tables, graphs. 21 ref.

10315 Analysis of Fully Developed Turbulent Heat Transfer and Flow in an Annulus With Various Eccentricities. Robert G. Deissler and Maynard F. Taylor. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3451, May 1955, 42 p. (TL570 Un3t)

Includes graphs, diagrams. 11 ref.

FOOD TECHNOLOGY

10316* Efficiency of Cooling Practices in Preventing Growth of Micrococci. W. A. Miller and Mary L. Smull. *American Dietetic Association, Journal*, v. 31, May 1955, p. 469-473.

Demonstrates danger accompanying slow and inadequate cooling of cooked foods stored in thick layers and subjected to various cooling methods, and to correlate rates and degree of cooling with multiplication of "food poisoning" micrococcus. Graphs, table. 5 ref.

10317 Browning Methods in Microwave Cooking. David A. Copson, Barbara R. Neumann, and Aaron L. Brody. *Journal of Agricultural and Food Chemistry*, v. 3, May 1955, p. 424-427.

Describes a method which utilizes the addition of materials normally found or used in foods to give microwave-cooked foods the characteristic browning of conventional cooked foods with a minimum of cooking time. Tables, photographs. 7 ref.

10318 Recent Developments in the Fish By-Products Industry. J. A. Lovern. *Journal of the Science of Food and Agriculture*, v. 6, May 1955, p. 233-239.

Design of driers; preservation of raw material; floating factories; recovery of solids in press liquor; deodorization. 53 ref.

See also:

9910 (nutrition and food processing)
9911 (food sterilization)

FUELS AND COMBUSTION

10319* On the Potassium Absorption of Carbonized Residue. **Über die Kaliumabsorption von Restkohlen.** (German.) Carl Kröger and Wilhelm Ruland. *Brennstoff-Chemie*, v. 36, nos. 7-8, Apr. 12, 1955, p. 97-103.

Determination of lattice spaces and K-vapor absorption of different types of C. Kinetic analysis of absorption process, determination of mechanically and chemically combined K, and comparison of radiographs of the carbonized substances and adducts. Tables, diagrams, graphs. 18 ref.

10320* Colloidal Fuels. G. C. H. Sharpe. *British Coal Utilisation Research Association, Monthly Bulletin*, v. 19, Mar. 1955, p. 97-106.

Advantages, properties, preparation, combustion, and economics of mixtures of powdered coal and fuel oil. Tables. 23 ref.

10321* Contribution to the Study of Sampling, Reduction, and Analysis of Solid Mineral Fuels. **Contribution à l'étude sur l'échantillonnage, la réduction et l'analyse des combustibles minéraux solides.** (French.) E. Rieffel and J. Danquigny. *Chaleur & Industrie*, v. 36, no. 357, Apr. 1955, p. 126-136.

Sampling of large coal shipments. Tables, graphs, diagrams.

10322* Manufacture of Water Gas From Coal. J. G. King. *Coke and Gas*, v. 17, May 1955, p. 181-184.

Choice of coal; yield of gas; gas-making cycle. Tables.

10323* Methods for Improving the Operation of the (Coal-) Dust Feed Unit. **Puti ratsionalizatsii raboty uzla pylepitaniia.** (Russian.) A. P. Kovalev, V. M. Maksimov, and Ia. M. Ostrovskii. *Elektricheskie Stantsii*, v. 26, no. 3, Mar. 1955, p. 7-11.

Automation of steam boilers requires better design of feed unit. Graphs, diagrams.

10324* Oil Gasification. W. J. Walters. *Gas Times*, v. 83, Apr. 29, 1955, p. 158 + 5 pages.

Discussion of the Hall process. Diagrams, tables. 4 ref.

10325* System of Pressure Conditions in a Coke Oven in the Light of Present Investigations. **Układ warunków ciśnieniowych pieca koksowniczego w świetle dotychczasowych badań.** (Polish.) Bohdan Kalinowski. *Hutnik*, v. 22, no. 3, Mar. 1955, p. 90-98.

Method of calculating gas product losses through the chamber walls. Filtration of gases through the walls of regenerators. Diagrams, graphs. 15 ref.

10326* Physical and Chemical Basis for Briquette Manufacture Without Bonding Agents. **A kötőanyag nélküli brikettezés fizikai és kémiai alapjai.** (Hungarian.) József Györki. *Magyar Kemikusok Lapja*, v. 10, no. 3, Mar. 1955, p. 70-76.

Grain size and distribution. Plasticity and elasticity resulting from the macromolecular state of the coal compounds. Table, graphs, diagrams. 29 ref.

10327 Gas Combustion Equipment. A. D. Wilcox. *Metal Progress*, v. 67, June 1955, p. 95-99.

Important properties of commercial gases that affect combustion and a description of the basic combustion systems being used in industry. Tables, graphs, diagrams.

10328 Low-Temperature Carbonization of Coal and Lignite for Industrial Uses. V. F. Parry. *U. S. Bureau of Mines, Report of Investigations* 5123, Apr. 1955, 27 p. (TN21 Un3r)

Methods of carbonizing coal; capacities of various retorting systems. Graphs, diagrams, photographs, tables. 6 ref.

10329 Carbonizing Tests With Tuscaloosa Oven 1952-53. J. B. Gayle and W. H. Eddy. *U. S. Bureau of Mines, Report of Investigations* 5125, Apr. 1955, 16 p. (TN21 Un3r)

Reproducibility of test-oven results; effect of variations in flue temperature on quality of cokes produced; carbonizing tests on selected coals and coal blends. Tables.

Books and Miscellaneous Publications

10330 Symposium on Coal Sampling. ASTM Special Technical Publication No. 162. 152 p. 1955. American Society for Testing Materials, Philadelphia. (TP325 Am35sc)

Historical background of the theoretical basis of coal sampling; a report on recent British work; the theoretical equations of variance applicable to sampling; experimental investigations.

GEOLOGY AND MINERALOGY

10331* Development of the Humins of Lignified Matter From Cellulose to Anthracite. **Die Entwicklung der Humine aus verholzter Materie Von der Zellulose zum Anthrazit.** (German.) Alfred Gillet. *Brennstoff-Chemie*, v. 36, nos. 7-8, Apr. 12, 1955, p. 103-120.

Comprehensive research report on the transformation of organic matter into different types of coal. Tables, graphs, structural diagrams, diagrams. 28 ref.

10332* The New Mineral Labuntsovite and the So-Called Titanoelpidite. **O novom minerale labuntsovite i o tak nazyvaemom titanoel'pidite.** (Russian.) E. I. Semenov and T. A. Burova. *Doklady Akademii Nauk SSSR*, v. 101, no. 6, Apr. 21, 1955, p. 1113-1116.

Chemical compositions and crystallography of labuntsovite, "titanoelpidite", and elpidite. Tables, graph, diagram. 2 ref.

10333 Note on the Al and Si Positions in Ordered Na and K Feldspars. George W. DeVore. *Science*, v. 121, May 13, 1955, p. 707-708.

Orientation of ionic chains. 3 ref.

Books and Miscellaneous Publications

10334 Proceedings of the Conference on Nuclear Processes in Geologic Settings. 82 p. 1953. The National Research Council, Washington, D. C. (QC806 C76p)

Decay of isotopes; spontaneous fission; radioactive ores.

See also:

10942 (radioactive waste disposal into the ground)

GEOPHYSICS

10335* Some Extreme Temperature Fluctuations Experienced by Living Plant Tissue During Winter in New Jersey. E. R. Biel, A. V. Havens, and M. A. Sprague. *American Meteorological Society, Bulletin*, v. 36, Apr. 1955, p. 159-162. Includes graphs. 2 ref.

10336* Recent Research on the Moon. II. Bubbles and Streaks. H. Percy Wilkins. *British Interplanetary Society, Journal*, v. 14, May-June 1955, p. 133-136.

Deals with strange domes or rounded structures, of which many are now known; also with the streaks or dusty markings considered by some observers to be due to the existence of some low form of lunar life. Diagrams, table.

10337* Chemical Configuration or Subterranian Waters. **La configuration chimique des eaux souterraines.** (French.) A. Herman. *Centre Belge d'Etude et de Documentation des Eaux, Bulletin (trimestrielle)*, 1955, no. 27, p. 37-45 + 2 plates.

Classification of waters and a quantitative analysis of their salts.

10338* The Significance of Organic Phosphorus Determinations in Ocean Waters. Bostwick H. Ketchum, Nathaniel Corwin and D. Jean Keen. *Deep-Sea Research*, v. 2, Apr. 1955, p. 172-181.

Advantages of the Harvey Method. Tables, graphs. 11 ref.

10339* Recent Advances in the Study of Micro-Climatology. W. G. V. Balchin. *Institution of Water Engineers, Journal*, v. 9, May 1955, p. 264-270 + 2 plates.

Plant micro-climatology; local climatic variations. Maps, photographs, graph. 15 ref.

10340* Power Spectra of the Eddy-Velocity Components. Harrison E. Cramer and Frank A. Record. *Journal of Meteorology*, v. 12, Apr. 1955, p. 146-151.

Observations, data analysis, and results. Graphs, tables. 12 ref.

10341 Project 'Shower': An Investigation of Warm Rain in the Hawaiian Islands. P. Squires. *Nature*, v. 175, Apr. 30, 1955, p. 748-750.

Physics of precipitation from clouds that are entirely above freezing point.

10342 Theories of the Earth's Magnetism. D. R. Inglis. *Reviews of Modern Physics*, v. 27, Apr. 1955, p. 212-248.

Includes diagrams, photographs. 33 ref.

Books and Miscellaneous Publications

10343 Biology of Deserts. J. L. Cloudsley-Thompson, editor. 224 p. 1954. Institute of Biology, London. (QH88 B52)

French and English papers from a symposium devoted to various aspects of desert biology. Covers climate and physical environment; ecology of plants, insects, and mammals; economic aspects; and mammalian physiology.

10344 Advances in Geophysics. H. E. Landsberg, editor. v. II. 286 p. 1955. Academic Press, New York. (QC806 Ad95)

Developments in seismometry and radar weather, atomic isotopes in geological chronometry; and modern statistics in geophysical analysis.

GRAPHIC ARTS

10345* Rotogravure Printing. Glossary. Joseph R. Caulfield. *American Pressman*, v. 65, May 1955, p. 25-31.

Includes photographs, diagrams.

10346* Calibration of Shutter Speeds. L. H. van der Tweel and J. Q. Keyman. *Applied Scientific Research*, v. 4, sec. B, no. 4, 1955, p. 255-260.

A number of focal plane and central-lens shutters were tested with a specially developed simple calibrating apparatus. Diagram, graph, tables. 1 ref.

10347 Electronic Computer for Color Printing. H. E. Rose. *Communication and Electronics*, 1955, no. 18, May, p. 268-272.

Computer solves three 4th-degree simultaneous equations in less than 50 μ sec. to establish the four ink values of color printing required to match the color of the original picture. Diagrams, table, photographs. 5 ref.

10348 Kerr-Cell Shutter Has Submicrosecond Speed. William Q. Nicholson and Irving Ross. *Electronics*, v. 28, June 1955, p. 171-173.

Photographic exposures of 0.1 μ sec. with effective aperture of f/7 are achieved by using Kerr-Cell shutter with standard press camera. Photographs, diagrams. 2 ref.

10349 Standard Size Drawings With Photocopying. Spencer R. Griffith. *Industrial Photography*, v. 4, May-June 1955, p. 40, 42.

Graphic Arts

Technique developed which facilitates handling of multi-size engineering drawings.

10350 Paper for Offset. II. J. E. Wilber. *Modern Lithography*, v. 23, May 1955, p. 46-47.

Special tests evaluate paper for offset printing. Photograph.

10351* Ink Formulation and Color Matching. I. Oscar Diehl. *National Lithographer*, v. 62, May 1955, p. 47-48.

Mixing and color matching to obtain proper tint and depth of color of offset printing inks.

10352* Water Flow Rates in Immersion-Washing of Motion-Picture Film. Samuel R. Goldwasser. *Society of Motion Picture and Television Engineers, Journal*, v. 64, May 1955, p. 248-253.

Method calculates rate at which water should be supplied for washing motion picture film in both cascade and parallel types of immersion systems. Graphs, tables. 6 ref.

10353* System for Automatic Additive Printing and Scene Testing of Color Film. Frank P. Herrnfeld. *Society of Motion Picture and Television Engineers, Journal*, v. 64, May 1955, p. 256-259.

General description; scene tester; punch and pick up unit; printer light-change mechanism; printer optical system. Graphs, diagrams. 2 ref.

Books and Miscellaneous Publications

10354 Photography. Theory and Practice. L. P. Clerc. 3rd Ed. 606 p. 1954. Pitman Publishing Corp., New York. (TR145 C59p3)

Optics; photographic recording; negative production; printing. Color photography.

HEAT POWER

10355 G. W. Propulsion Systems. *Aeroplane*, v. 88, May 20, 1955, p. 668-672.

Rocket motors. Ramjet and turbojet engines. Photographs, diagram. 1 ref.

10356 Engineering Details of Ford Rotary Heat Exchanger for Gas Turbine Engines. W. Wai Chao. *Automotive Industries*, v. 112, May 15, 1955, p. 54-56.

Includes photographs. 7 ref.

10357 Exhaust Valve Corrosion in Gasoline Engines. C. H. Allen and M. J. Tauschek. *Automotive Industries*, v. 112, June 1, 1955, p. 52-55, 116, 118.

Review of corrosion resistance of various valve steels. Graphs.

10358 Comparator for Gas-Turbine Blade Roots. L. W. Nickols. *Engineering*, v. 179, May 20, 1955, p. 625-627.

Principles of operation; features of the comparator; sensitive adjustment of strut length; rotating turret; setting and operating the comparator; measuring the pitch of serration centers. Diagrams, photographs.

10359* Measuring Pressure Distributions on Rotating Turbine Blades. **Druckverteilungsmessungen an umlaufenden Turbinenschaufeln.** (German.) Werner Fister. *Forschung auf dem Gebiete des Ingenieurwesens*, v. 21, Ausgabe B, *VDI-Forschungsheft* 448, 1955, 32 p.

Results obtained for constant energy drop across a turbine up to speeds of 10,000 r.p.m. are compared with measurements made on a two-dimensional stationary cascade. Photographs, diagrams, tables, graphs. 23 ref.

10360 Mixture Ratio and Temperature Surveys of Ammonia-Oxygen, Rocket Motor Combustion Chambers. Dwight I. Baker. *Jet Propulsion*, v. 25, May 1955, p. 217-226.

Investigates combustion process in liquid-propellant motors to determine the gas-temperature and gas-composition distributions throughout the thrust chamber and to correlate the internal distributions with the observed motor performance. Graphs, diagrams. 4 ref.

10361 A Combustor Analysis Method Evolved From Basic Flame Stability and Fuel Distribution Research. John W. Bjerklie. *Jet Propulsion*, v. 25, May 1955, p. 227-231, 234.

Includes graphs, diagrams. 5 ref.

10362* Gas Turbines. **Turbines à gaz.** (French.) Riollet. *Revue de l'Industrie Minérale*, v. 36, no. 622, Apr. 1955, p. 490-499.

Theory; efficiency; types; fields of application. Diagrams.

10363 The Prospects and Problems of Rocket Propulsion for Aircraft. A. D. Baxter. *Royal Aeronautical Society, Journal*, v. 59, May 1955, p. 315-332; disc., p. 332-338.

Comparative performance; aircraft uses; rocket motor problems; combustion chamber design. Diagrams, graphs, photographs, tables. 9 ref.

10364* Utilization of Compressed Air and Determination of the Characteristics of the Compressor and Turbine of a Turbo-Jet Engine. **Pobór sprężonego powietrza i wyznaczanie charakterystyk sprężarki i turbiny silnika turbo-odrzutowego.** (Polish.) Jerzy Wolf. *Technika lotnicza*, v. 20, no. 2, Mar.-Apr. 1955, p. 34-44.

Engineering and design problems connected with utilization of ram effect; handling of fuels; discharge of air. Optimum interrelation of factors. Graphs, diagrams, photographs.

10365* Low Velocity Flame Propagation in a Compressible Flow. **Propagation a faible vitesse d'une flamme dans un écoulement compressible.** (French.) G. Ernst. *Technique et science aéronautiques*, v. 1, 1955, p. 1-12.

Theoretical analysis. Application in calculation of combustion chambers of jet engines. Diagrams, graphs. 5 ref.

10366 Investigation of Jet-Engine Noise Reduction by Screens Located Transversely Across the Jet. Edmund E. Callaghan and Willard D. Coles. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3452, May 1955, 27 p. (TL570 Un3t)

Screens lowered the sound pressure levels rearward and increased them in front resulting in a nearly circular, nondirectional sound field. Diagrams, graphs, photograph, table. 10 ref.

See also:

10012 (determination of O in boiler feed water)

INFORMATION—PREPARATION AND DISSEMINATION

10367 The Preparation of Printed Indexes by Automatic Punched-Card Techniques. Eugene Garfield. *American Documentation*, v. 6, Apr. 1955, p. 68-76.

Utilization of machines facilitate compilation of conventional type indexes. Photographs. 3 ref.

10368 Editing Graphs for Publication. Ernst M. Cohn. *American Documentation*, v. 6, Apr. 1955, p. 77-86.

Includes graphs, tables, diagrams. 3 ref.

10369 Machine Literature Searching. VIII. Operational Criteria for Designing Information Retrieval Systems. Allen Kent, Madeline M. Berry, Fred U. Luehrs, Jr., and J. W. Perry. *American Documentation*, v. 6, Apr. 1955, p. 93-101.

Concerned with establishing and quantitatively defining criteria for measuring the capabilities and usefulness of such systems. Diagrams, graphs. 1 ref.

INSTRUMENTATION AND LABORATORY APPARATUS

10370* A Thermostat to Replace Low-Temperature Slush Baths. C. Taylor. *Applied Scientific Research*, v. 4, sec. B, no. 4, 1955, p. 271-277.

Simple thermostat for range of temperatures down to −170 C fits inside a 1-1. Dewar flask and is intended as an aid in handling volatile substances in vacuum systems. Diagrams, table. 5 ref.

10371 Desorption of Gas in the Cold Cathode Ionization Gauge. E. Brown and J. H. Leck. *British Journal of Applied Physics*, v. 6, May 1955, p. 161-164.

Investigation of the desorption that takes place by heating and by ion bombardment. Diagram, graphs, table. 9 ref.

10372 An Apparatus for the Determination of Dipole Moments. C. C. Meredith and George F. Wright. *Canadian Journal of Technology*, v. 33, May 1955, p. 182-193.

Machine determines precisely the dielectric constant of either 15 ml. of liquid or 0.5 g. of solid. Diagrams, photographs, graph. 6 ref.

10373* Improving Furnace Performance by Model Investigation. M. W. Thring. *Coke and Gas*, v. 17, May 1955, p. 176-180.

Includes graphs. 19 ref.

10374* A New Approach to Infra-Red Instrumentation. A. G. Peacock. *Communications and Electronics*, v. 2, June 1955, p. 58-62.

Development of a simple grating-type infra-red spectrometer greatly extends the scope of infra-red spectrographic analysis both in the laboratory and the factory. Graphs, diagram, photograph. 17 ref.

10375 Preparative Methods of Electron Microscopy and Their Results. **Präparative Methoden der Elektronenmikroskopie und ihre Ergebnisse.** (German.) H. König. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 188-247. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Comprehensive review of recent literature on the technique of electron microscopy as used in the medical, biological, and physical sciences. Diagrams, photographs, micrographs. 208 ref.

10376 A Rapid General Purpose Centrifuge Sedimentation Method for Measurement of Size Distribution of Small Particles. II. Procedures and Applications. K. T. Whitby. *Heating, Piping & Air Conditioning*, v. 27, June 1955, p. 139-145.

Includes tables, graphs. 4 ref.

10377 Level Control. Arthur E. Fleming. *Instruments and Automation*, v. 28, May 1955, p. 809-815.

Résumé of float-actuated and displacement-type liquid level controllers. Photographs, diagrams, graph.

10378* Exploiting the Displacement Level Principle. Paul Wing, Jr. *ISA Journal*, v. 2, May 1955, p. 141-144.

A few unusual applications or adaptions of the basic level measuring system which increase the operating limits substantially or even enter new fields as in the case of specific gravity measurement or solids level. Graph, diagrams.

10379* A New Viscodilatometer With Applications to the Trommsdorf Effect in Unsaturated Polyester Resins. Manfred Gordon and Brian M. Grieveson. *Journal of Polymer Science*, v. 17, May 1955, p. 107-115.

Certain polyester "contact" resins are studied. Graphs, diagram. 9 ref.

10380 A Simple, Sensitive, Saturated-Core Recording Magnetometer. V. B. Gerard. *Journal of Scientific Instruments*, v. 32, May 1955, p. 164-166.

Principle; performance; tests. Graphs, table, diagram. 3 ref.

10381 An Infra-Red Radiation Pyrometer. J. D. Harmer and B. N. Watts. *Journal of Scientific Instruments*, v. 32, May 1955, p. 167-170.

Principles; description; calibration; emissivity correction. Graph, photograph, diagrams. 7 ref.

10382 A Tilting Micromanometer With Continuous Sensitivity Control. L. R. Taylor. *Journal of Scientific Instruments*, v. 32, May 1955, p. 173-177.

Description; reading procedure; calibration; sensitivity; limits of accuracy. Tables, graphs, diagram, photograph. 8 ref.

10383 A Single-Profile Crystal Extensometer Adjustable for Orientation. A. J. Kennedy. *Journal of Scientific Instruments*, v. 32, May 1955, p. 183-185.

Design of the device. Table, diagrams. 8 ref.

10384 Measurement and Specification of Color and Small Color Differences. W. J. Goodwin. *Modern Plastics*, v. 32, June 1955, p. 143 + 9 pages.

Principles; applications to the plastics industry. Graphs, diagrams, spectra. 4 ref.

10385 Instrumentation for Noise Measurements. William B. Snow. *Noise Control*, v. 1, May 1955, p. 16-21, 56.

Various modern instruments for measuring mechanical noise are described and illustrated. Purpose and range of application are outlined. Photographs, graphs.

10386* Instrumentation and Automatic Control in Oil Refineries. V. Electrical Systems. E. H. W. Banner. *Petroleum*, v. 18, May 1955, p. 170-175.

Includes diagram, circuit diagrams, photographs. 3 ref.

10387 Electronic Vacuum Gauges. A. A. Schulke. *Radio-Electronics*, v. 26, June 1955, p. 58-61.

Theory and circuitry of instruments for measuring extremely low pressures. Diagrams, graphs.

10388 Causes of Failure of Vacuum Systems. W. E. Bush. *U. S. Atomic Energy Commission, UCRL-1887*, July 1952, 4 p. (UF767 U3u)

Troubleshooting tips; test instruments; most likely sources of trouble.

10389* Resonance-Vibration Meter. **Resonanzschwingungsmesser.** (German.) A. Weiler. *VDI Zeitschrift*, v. 97, nos. 11-12, Apr. 15, 1955, p. 344-346.

New mechanical device for measuring the vibrations of machine parts in the frequency range of 6 to 600 cycles and amplitude range of 5 to 500 μ. Graphs, photographs. 4 ref.

10390* Measuring Small Radiating Powers With Thermocouples. **Zur Messung sehr geringer Strahlungsleistungen mit Thermoelementen.** (German.) Fritz Hoffman and Ulrich Schley. *Zeitschrift für angewandte Physik*, v. 7, no. 3, Mar. 1955, p. 109-113.

Optical and electrical arrangements for measuring radiation in terms of microvolts. Diagrams, tables, graphs. 5 ref.

10391* High Vacuum Furnaces. **Hochvakuumöfen.** (German.) Werner Scheibe. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 242-253.

Structural characteristics; fields of application. Photographs, diagrams, table. 13 ref.

See also:

10887 (electron microscopy)

LUBRICATION AND FRICTION

10392 Fluorine-Containing Lubricants. A. J. Rudge. *Chemistry & Industry*, 1955, no. 17, Apr. 23, p. 452-461.

Syntheses, properties, and performance of fluorocarbons and the cheaper chloro-fluorocarbons. Tables. 19 ref

10393 Selecting Miniature Bearings. H. M. Dardani. *Electronic Design*, v. 3, May 1955, p. 42-45.

Types and uses of bearings for electronic devices. Tables, diagrams, nomographs, photographs.

10394 The Structure of Lubricating Greases Under the Light Microscope in Relation to Their Performance. J. F. Hutton, J. B. Matthews, and N. A. Scarlett. *Institute of Petroleum, Journal*, v. 41, May 1955, p. 163-169.

Includes micrographs, table, photographs. 11 ref.

10395* Progress in the Application of Industrial Lubricants. *Lubrication*, v. 41, May 1955, p. 49-60.

Bottle oilers and their variations; central systems. Photographs, diagrams.

10396 Overlay Bearings. J. B. Mohler. *Metal Industry*, v. 86, May 6, 1955, p. 375-378.

Seizing resistance of various alloy combinations. Photographs, table. 10 ref.

Lubrication and Friction

10397 Lubricants for Titanium. Ernest Rabinowicz and E. P. Kingsbury. *Metal Progress*, v. 67, May 1955, p. 112-114.

Certain long-chain hydrocarbons with active at. groupings attached along the chain are best so far discovered; they reduce the coefficient of friction by two thirds, and wear by a factor or ten or more. Graph, diagram.

10398* Analysis of the Operation of Ball-and-Socket Bearings Used in Aircraft Instruments. **Analiza pracy łożysk z czopami kulistymi stosowanymi w przyrządach lotniczych.** (Polish.) Roman Calikowski. *Technika lotnicza*, v. 20, no. 2, Mar.-Apr. 1955, p. 52-56.

Clearances, stresses, and friction in bearings of panel instruments. Material selection factors. Tables, diagrams, graphs. 9 ref.

10399* Hydrodynamic Theory of Lubrication During Rolling. **Gidrodinamicheskaia teoriia smazki pri kachenii.** (Russian.) P. L. Kapitsa. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 747-762.

Equations for viscosity, pressure, friction, and coefficient; pattern of lubrication with cylinders or spheres rolling in lubricating layer. Graphs, drawings. 3 ref.

Books and Miscellaneous Publications

10400 Basic Lubrication Practice. Allen F. Brewer. 286 p. 1955. Reinhold Publishing Corp., New York. (TJ1075 B75b)

Practical, on-the-job information for lubrication and maintenance engineers, plant or shop foremen, purchasing agents, and students.

MECHANICAL ENGINEERING

10401 Problem of the Stillson Wrench. F. H. Northover. *American Journal of Physics*, v. 23, May 1955, p. 276-278.

Basic principles underlying the working of the Stillson type of wrench. Diagram.

10402 Production Considerations in the Design of Heavy Machinery. C. A. Jurgensen. *American Society of Mechanical Engineers, Paper No.* 55-MD-3, 1955, 4 p. (TJ1 Am35p)

Deals with the production considerations that determine good machine design and how these factors may govern quality, cost, and development expense.

10403 The Stresses in a Simple Supported Reinforced Annular Plate Uniformly Loaded. Irving Granet. *American Society for Naval Engineers, Journal*, v. 67, May 1955, p. 513-520.

Develops equations for the stresses and deflections; compares the material economics in using a reinforced hub. Diagrams. 5 ref.

10404 The Solution of Plane Stress Problems by an Electrical Analogue Method. G. Liebmann. *British Journal of Applied Physics*, v. 6, May 1955, p. 145-157.

Principle of a resistance-network analogue method for stress analysis. Diagrams, graphs, tables. 16 ref.

10405 Tests on Stanchions Bent in Single Curvature About Both Principal Axes. J. W. Roderick. *British Welding Journal*, v. 2, May 1955, p. 217-224.

It is concluded that, if all the beams remain elastic, the stiffness of the minor-axis beams has an important effect on the stanchion collapse load, but the loads on either set of beams have comparatively little influence. Photographs, graphs, tables, diagrams. 3 ref.

10406* Liquid Springs: Progress in Design and Application. A. E. Bingham. *Chartered Mechanical Engineer*, v. 2, May 1955, p. 249-252.

Compressed fluid is used as the springing medium and at the same time, the same vol. of liquid is used as the dash-pot fluid. Photograph, graphs, diagrams.

10407 Motor-Compressor Is Smaller by 75 Per Cent. *Chemical Processing*, v. 18, May 1955, p. 182-183.

Epoxy sealed stator permits efficiencies in a gear-type motor compressor with only 12 parts. Diagram, photograph.

10408 Pump Selection. Duke Silverstrine and Bruce Fader. *Chemical Processing*, v. 18, June 1955, p. 196-198.

A nomographic method based on power costs.

10409 Tie Simplicity to Power With Pneumatic Servomechanisms. Harold Levenstein. *Control Engineering*, v. 2, June 1955, p. 65-70.

Derives the transfer function and suggests an unusual stabilizing technique for a linear pneumatic motor. Diagrams, graphs.

10410 Package Design at Lederle. Peter Horton. *Drug and Cosmetic Industry*, v. 76, May 1955, p. 641, 643, 721.

Considerations for new projects are outlined. Diagram, photograph.

10411* Inclined Hangers as Bridge Stiffeners. E. M. Rensaa. *Engineering Journal*, v. 38, May 1955, p. 615-619.

Studies of design analysis of arches with inclined hangers. Diagrams. 8 ref.

10412 Preventing Steam Short Circuiting. T. H. Rea. *Heating, Piping & Air Conditioning*, v. 27, June 1955, p. 100-103.

Short circuiting of backflow in steam pipes or steam condensing units can be avoided by insuring proper drainage. Analysis of cause and cure by proper use of steam traps. Diagrams, tables.

10413* Problems Connected With the Rhombus. II. Plastic Torsion. K. T. Sundara Raja Iyengar and S. K. Lakshmana Rao. *Indian Institute of Science, Journal*, v. 37, sec. B, Apr. 1955, p. 113-120.

The relaxation technique is used to obtain a numerical solution in the case of plastic torsion. Diagram, graph. 2 ref.

10414 Prediction of Creep-Deflection and Stress Distribution in Beams From Creep in Tension. W. N. Findley and J. J. Poczatek. *Journal of Applied Mechanics*, v. 22, June 1955, p. 165-171.

A method of predicting creep in bending from data on creep in tension was derived and applied to creep of a canvas laminate. The deflections compared favorably with test data. It was shown that stress distribution remained constant during creep in bending when creep in tension and compression were equal and the coefficient of the time-dependent term was equal to the time-independent term. Methods of determining creep deflections of beams having nonuniform bending moments are described. Graphs. 24 ref.

10415 Further Work on the General Three-Dimensional Photoelastic Problem. Max M. Frocht and Roscoe Guernsey, Jr. *Journal of Applied Mechanics*, v. 22, June 1955, p. 183-189.

A general and practical method of solution is reviewed briefly, and possible variations in procedure are discussed. Diagrams, graphs, table, stress patterns. 14 ref.

10416 Stress-Concentration Factors in Shafts With Transverse Holes as Found by the Electroplating Method. H. Okuko and S. Satō. *Journal of Applied Mechanics*, v. 22, June 1955, p. 193-196.

Torsion of shafts with transverse holes was investigated experimentally. Graph, tables, photographs, diagram. 6 ref.

10417 Frictional Vibrations. David Sinclair. *Journal of Applied Mechanics*, v. 22, June 1955, p. 207-213.

Frictional vibrations, such as stick-slip motion and automobile-brake squeal, which occur when two solid bodies are rubbed together, are analyzed mathematically and observed experimentally. Table, photographs, graphs. 17 ref.

10418 Acceleration in Mechanisms. R. T. Hinkle and J. S. Frame. *Journal of Applied Mechanics*, v. 22, June 1955, p. 222-226.

An equation is derived for finding instantaneous radii of curvature for paths of relative motion described by coincidental points of contact of direct-contact mechanisms, and a graphical method for solving the equation for these radii is developed. Diagrams.

10419 Load Distribution at the Intersection of Several Coaxial Axisymmetric Shells. H. Becker. *Journal of Applied Mechanics*, v. 22, June 1955, p. 232-234.

Theory; shear load-distribution cycle; special cases; application of method. Diagrams.

10420 Solving Highly Complex Elastic Structures in Easy Stages. Gabriel Kron. *Journal of Applied Mechanics*, v. 22, June 1955, p. 235-244.

A systematic procedure solves very large elastic structures, containing hundreds of component elements. Method is not competitive with existing techniques of solving sets of linear equations but is to be used only when other methods prove inadequate to cope with the capacity of the available computer (slide rule or electronic). Diagrams, graph. 16 ref.

10421 On the Nonlinear Differential Equation for Beam Deflection. E. J. Scott and D. R. Carver. *Journal of Applied Mechanics*, v. 22, June 1955, p. 245-248.

A general solution of nonlinear beam equation is given for all problems in which the moment can be expressed as a function of the independent variable alone. Graphs.

10422 Problems of Plane Elasticity for Reinforced Boundaries. J. R. M. Radok. *Journal of Applied Mechanics*, v. 22, June 1955, p. 249-254.

A general method was deducted for investigation of the stress distribution around compactly reinforced holes in infinite plates. Tables, graphs, diagram. 8 ref.

10423 Stress Distribution in a Uniformly Rotating Equilateral Triangular Shaft. H. T. Johnson. *Journal of Applied Mechanics*, v. 22, June 1955, p. 255-259.

A general method is employed which may be applied in obtaining approximate solutions for the stress distribution for rotating prismatic shapes, for the cases of either generalized plane stress or plane strain. Graphs, tables. 6 ref.

10424 Further Problems in Orthotropic Plane Stress. H. D. Conway. *Journal of Applied Mechanics*, v. 22, June 1955, p. 260-262.

Solution is given for the infinite orthotropic plate containing an elliptical hole, the plate being subjected to tension at infinity and the axes of the hole and the direction of the tension inclined at arbitrary angles to the principal axes of orthotropy.

10425 Stresses Due to Diametral Forces on a Circular Disk With an Eccentric Hole. A. M. Sen Gupta. *Journal of Applied Mechanics*, v. 22, June 1955, p. 263-266.

Stresses were determined when the disk is compressed along the line of centers by two equal and opposite forces acting on its outer edge, the inner edge being unstressed. From results obtained, solution of the problem of a semi-infinite plate acted on by a concentrated normal force on its straight boundary and containing an unstressed circular hole was deduced. Tables, graph, diagram.

10426 Bending of Orthogonally Stiffened Plates. W. H. Hoppmann. *Journal of Applied Mechanics*, v. 22, June 1955, p. 267-271.

Flexure theory for plates of orthotropic material is applied in the case of orthogonally stiffened plates using an experimental method to determine plate stiffnesses in bending and in twisting. Diagrams, graphs, tables, photograph. 16 ref.

10427 Impact Pressure Loading of Rigid-Plastic Cylindrical Shells. P. G. Hodge, Jr. *Journal of the Mechanics and Physics of Solids*, v. 3, Apr. 1955, p. 176-188.

Considers a shell, loaded for a short time with a pressure greater than the collapse load; expressions for the stresses, velocities, and displacements are found in each case. Diagrams, graphs, table. 8 ref.

10428* The Hydraulic Transport of Solid Material in Pipes. R. C. Worster and D. F. Denny. *Mining Journal*, v. 244, Apr. 15, 1955, p. 410-411.

Flow in horizontal pipes; liquid density; flow in vertical pipes; factors of stability; settling velocity of particles. Graphs, diagram, table. 1 ref.

10429 Techniques for Noise Measurement and Evaluation of Data. R. S. Gales. *Noise Control*, v. 1, May 1955, p. 22-29.

Procedures for mecahnical noise. Graphs. 10 ref.

10430* Explains New Selection Tables for V-Belt Drives. H. W. Kumro. *Plant*, v. 11, May 1955, p. 68-70.

Includes tables.

10431 Dry Filling Equipment. *Soap and Chemical Specialties*, v. 31, May 1955, p. 103 + 5 pages.

Describes systems and equipment of 11 manufacturers. Photographs.

10432 Flexural Rigidity of a Rectangular Strip of Sandwich Construction. H. W. March and C. B. Smith. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1505, Feb. 1955, 18 p. (TS800 Un3.3r)

Includes diagrams. 8 ref.

10433 Supplement to Analysis of Long Cylinders of Sandwich Construction Under Uniform External Lateral Pressure. Facings of Moderate and Unequal Thicknesses. Milton E. Raville. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1844-A, Feb. 1955. 22 p. (TS800 Un3.3r)

Sandwich cylinders subjected to uniform lateral loading with consideration given to the effect of the stiffnesses of the individual facings; application of results to cylinders having facings of unequal thickness. Diagrams, table. 5 ref.

10434 Stresses Induced in a Sandwich Panel by Load Applied at an Insert. W. G. Youngquist and Edward W. Kuenzi. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1845, Mar. 1955, 11 p. (TS800 Un3.3r)

Results of tests. Tables, diagrams, graphs, photographs. 7 ref.

10435* Morphologic-Analytical Method of Designing. **Morphologisch-analytische Konstruktionsmethode.** (German.) Fritz Kesselring. *VDI Zeitschrift*, v. 97, nos. 11-12, Apr. 15, 1955, p. 327-331.

Demonstrates, on electrical devices, the advantage of using morphological and analytical methods of designing new or modifying existing equipment. Diagrams, table. 3 ref.

Books and Miscellaneous Publications

10436 Turboblowers. A. J. Stepanoff. 377 p. 1955. John Wiley & Sons, New York. (TJ969 St43t)

Theory, design, and application of centrifugal and axial flow compressors and fans.

See also:

10798 (handling radioactive materials)

METALLURGY

10437 Many Applications for Aluminum in Automatic Drives. Joseph Geschelin. *Automotive Industries*, v. 112, May 1955, p. 62-64, 130, 132.

Use of die cast aluminum parts in the automobile industry. Photographs.

10438 Isotopes and Metals Engineering. II. G. G. M. Carr-Harris. *Canadian Metals*, v. 18, May 1955, p. 22-26.

Use of radioactive tracers and radiography in design and production of metal products. Photographs.

10439* The Coppers. XI. *Copper & Brass Builetin*, 1955, May, no. 173, p. 8-9.

Composition and properties of various types of copper and copper base alloys. Photograph, table.

10440* Economics of Aluminium Sheet as Cladding for Industrial Buildings. *Engineer*, v. 199, May 20, 1955, p. 694-696.

Thermal transmittance of corrugated Al sheeting. Results were considered upon an economic basis. Photographs, tables, diagrams.

10441 Metallurgical Developments in Copper-Base Alloys. James S. Vanick. *Foundry*, v. 83, June 1955, p. 96-99.

Alloy compositions; properties; foundry practice. Photographs, tables. 4 ref.

10442* Low-Alloy Constructon Steels With Boron Addition. **Niskostopowe stale konstrukcyjne z dodatkiem boru.** (Polish.) S. Wojciechowski. *Hutnik*, v. 22, no. 1, 1955, p. 23-30.

Survey of Russian, English, German, and native articles on contemporary production, chemical analyses of various B steels, their uses, and effect of B on hardenability. Tables, graphs. 24 ref.

Metallurgy

10443 Melting Furnaces for Non-Ferrous Metals. II. W. A. Darrah. *Industrial Heating*, v. 22, Apr. 1955, p. 726 + 4 pages.

Various types of furnaces are described. Photographs. (To be continued.)

10444 How Users Benefit From Pearlitic Malleable Castings. G. B. Mannweiler. *Iron Age*, v. 175, May 19, 1955, p. 111-114.

Cast pearlitic alloys cover a wide range of strength and hardness values, can be heat treated to meet service conditions, offer excellent machinability, good surface finish, and intricate, close-tolerance castability. Micrograph, graph, photographs.

10445 Some Recent Developments in Stainless Steels. J. I. Morley. *Iron & Steel*, v. 28, May 1955, p. 183-188.

Heat treatment, mechanical properties and structure of precipitaton-hardening Cr-Ni steels. Advantages and disadvantages of cold-worked stainless steels. Tables, graphs, micrograph. 8 ref.

10446 Fabrication of Titanium Components. Arnold S. Rose. *Jet Propulsion*, v. 25, May 1955, p. 212-216, 234.

Titanium alloys; forming operations; forging; spinning; welding. Photographs, graphs, diagrams.

10447 Impact of Magnetism Upon Metallurgy. C. Zener. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 619-630.

Influence of the magnetic properties of the constituent atoms upon the various properties of metals and alloys. Tables, graphs, diagrams. 49 ref.

10448 An X-Ray Study of the System Uranium Monocarbide-Uranium Dicarbide-Beryllium Carbide. M. D. Burdick, H. S. Parker, R. S. Roth, and E. L. McGandy. *Journal of Research, National Bureau of Standards*, v. 54, Apr. 1955, p. 217-229.

X-ray diffraction methods applied to study of system heated to 1700 C and quenched. Room temperature stability of U_2C_3 is verified. Tables, graphs, diagram, phase diagrams. 21 ref.

10449* New Points of View on Alloyed Types of Structural and Machine Steel. **Nieuwe gezichtspunten inzake gelegeerde constructie- en machinestaalsoorten.** (Dutch.) André Michel. *Metalen*, v. 10, no. 8, Apr. 30, 1955, p. 103-109.

Development of low alloyed construction steels; use of Cr, Ni, and Mo; need for research on new steels and heat treatment methods.

10450 British Furnace Developments. D. Llewellyn. *Metal Industry*, v. 86, Apr. 29, 1955, p. 339-344.

Advantages and disadvantages of furnaces for melting and heat treating. Table, photographs.

10451 British Preferences for Metals in Refinery Equipment. (Digest of "Metals in Oil Refining", by I. H. Thomas; *Journal of the Birmingham Metallurgical Society*, v. 34, June 1954, p. 51-70.) *Metal Progress*, v. 67, May 1955, p. 134, 136, 138, 140.

Metallurgical tests of materials used for refinery equipment in Great Britain.

10452 Effect of Beryllium Alloying Additions. (Digest of "Beryllium as an Alloying Addition", by L. David; *Metallurgia*, v. 50, Nov. 1954, p. 236-238.) *Metal Progress*, v. 67, May 1955, p. 152, 154, 156.

Primarily used in magnesium, aluminum, nickel, and copper-base alloys in which small beryllium additions effect large property changes. Most extensive use is in copper alloys because of its ability to harden copper by low-temperature aging.

10453 Arc-Cast Molybdenum—Fabrication of Parts. N. L. Deuble. *Metal Progress*, v. 67, June 1955, p. 101-105.

General characteristics that govern mechanical properties and successful working methods are described. Photographs, table, diagram. 6 ref.

10454 A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 22, May 1955, p. 203-210.

Covers "platinum alloys" to "preferential deformation". Tables, micrographs, diagrams, photographs. (To be continued.)

10455* Aluminum in Railroad Equipment. G. B. Hauser. *Modern Metals*, v. 11, May 1955, p. 33-34, 36-37.

Applications of aluminum alloys in rolling stock and other equipment. Photographs.

10456* New Aluminum Bus Conductor. *Modern Metals*, v. 11, May 1955, p. 38-39.

Mechanical, physical, and forming properties. Tables, photograph.

10457* The All-Aluminum Dyna-Panhard. *Modern Metals*, v. 11, May 1955, p. 59-62, 64.

Applications and advantages of Al alloys in light-wt. French automobile. Photographs, graphs.

10458 Precision Contour Rolling Teams With Welding to Produce Steel Propellors. A. E. Felt. *Steel Processing*, v. 41, May 1955, p. 305-309.

Contour rolling, fabrication, heat treating, finishing, and balancing of steel propellor blades. Photographs, diagrams.

10459* Magnesium-Zirconium Alloy Castings in Aircraft Production. **Les pièces moulèes en alliages magnesium-zirconium dans la construction aèronautique.** (French.) M. R. Pradeau. *Technique et science aéronautiques*, v. 1, 1955, p. 23-29

Chemical composition; crystal structure and mechanical properties; fields of application. Tables, graphs, photographs. 6 ref.

10460 Selenium Data. J. D. Sargent. *U. S. Bureau of Mines, Information Circular* 7715, Apr. 1955, 29 p.

Physical and chemical properties; geology and mineralogy; geographic distribution and foreign production; domestic production, consumption, and foreign trade. Tables, graph, map, diagram. 192 ref.

10461 Casting and Fabrication of High-Damping Manganese-Copper Alloys. J. A. Rowland, C. E. Armantrout, and D. F. Walsh. *U. S. Bureau of Mines, Report of Investigations* 5127, Apr. 1955, 19 p. (TN21 Un3r)

Melting and casting; mechanical working and heat treating ingots. Graphs, photographs. 15 ref.

10462 Metallurgical Properties of Silver-Cadmium-Copper-Zinc Brazing Alloys. Karl M. Weigert. *Welding Journal*, v. 34, May 1955, p. 421-424.

Formation and physical properties of metallurgical phases of the Ag-Cd-Cu-Zn quaternary alloys. Graphs. 9 ref.

Books and Miscellaneous Publications

10463 Testing Metals. **Prüfung Metallischer Werkstoffe.** (German.) Eugen Hanke. 683 p. 1954. VEB Verlag Technik, Berlin. (TA460 H19p)

Destructive and nondestructive methods for determining mechanical, physical, chemical, and electrical properties; procedures, testing equipment, preparation of specimens; effect of chemical composition, and other factors on properties and structure.

10464 Magnesium Laboratory Methods. 146 p. 1955. Dow Chemical Co., Midland, Michigan. (TN799.M2 D75mL)

Methods used in physical and mechanical testing, metallographic examination, chemical analysis, spectrographic analysis, and radiography.

10465 Boron Steels—Production and Use. Technical Assistance Mission No. 124. 140 p. 1954. Organisation for European Economic Co-Operation, Paris. (TN757.B6 Or3b)

Manufacture and application of B and other low alloy steels. Summary of the discussion between European and U. S. experts.

See also:

10215 (electric contact alloys)

METALS—EXTRACTION AND REFINING

10466* Some Factors Influencing the Production of Manganese. H. W. Hosking. *Australasian Engineer,* 1955, Mar., p. 70-75.

Successful operation of the two-stage process depends on control of fusion points, viscosities, and thermal and electrical conductivities of the slags involved. Diagrams, graphs.

10467* Ingots and Ingot Production. II. Ingot Defects. G. Reginald Bashforth. *British Steelmaker,* v. 21, May 1955, p. 146-150.

Explains various defects which may arise and their probable causes. Particular attention is devoted to ingot cracks. Diagrams. 16 ref.

10468* Continuous Casting of Steel. J. S. Morton. *British Steelmaker,* v. 21, May 1955, p. 152-157.

General review covering the underlying aims and economic significance of the process, technical problems which have been encountered, operation of a typical plant, and a useful survey of all the known techniques evolved to date. Photograph, graph, diagram, table. 4 ref.

10469 Experimental Production of Pig Iron and Steel From Comineo Iron Concentrates. B. G. Hunt, E. J. Kwasney, W. P. Campbell, and S. L. Gertsman. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 517, May 1955, p. 281-291; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 147-157.

Details are given of the steel making and fabrication procedure, of the visual and microscopic examination, and of the extensive series of tests on the steel produced. Photographs, micrographs, diagrams, tables, graphs. 2 ref.

10470 The Oxygen Flash Smelting Process of the International Nickel Company. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 517, May 1955, p. 292-300; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 158-166.

A process developed for autogenous smelting of fine sulphides. Diagrams, tables, graphs, photographs. 17 ref.

10471* Technical Preparation of Substances in Pure Condition. Shown on the Semifinished Germanium. **Technische Reindarstellung von Substanzen. Gezeigt am Germanium.** (German.) F. W. Dehmelt. *Chemie-Ingenieur-Technik,* v. 27, no. 5, May 1955, p. 275-278.

Description is given of the zone melting process for the preparation of Ge in pure condition. Table, diagrams, graphs. 6 ref.

10472* Mechanism of the Desulfurizing of Iron. **O mekhanizme obesserivaniia chugunov.** (Russian.) I. L. Korkiia, O. A. Esin, and V. V. Mikhailov. *Doklady Akademii Nauk SSSR,* v. 101, no. 6, Apr. 21, 1955, p. 1065-1067.

A critique of the theories of Chang, Goldman, and others. Equations for reactions in the slag. Table, diagram. 4 ref.

10473* Oxidation of Phosphorus Dissolved in Liquid Iron and the Effect of Phosphorus on the Solubility of Oxygen. **Okislenie fosfora, rastvorennogo v zhidkom zheleze, i vliianie fosfora na rastvorimost' kisloroda.** (Russian.) N. P. Levenets and A. M. Samarin. *Doklady Akademii Nauk SSSR,* v. 101, no. 6, Apr. 21, 1955, p. 1089-1092.

Reaction equations. Variation of activity of the O and P explained by the formation of triphosphate of iron and other compounds of P with Fe. Graphs. 2 ref.

10474* Study of Wetting Ability of Slags in the Electric Furnace Melting of Steel. **Izuchenie smachivaiushchei sposopnosti shlakov elektroplavki stali.** (Russian.) A. I. Kholodov, S. I. Suchil'nikov, and I. P. Malkin. *Doklady Akademii Nauk SSSR,* v. 101, no. 6, Apr. 21, 1955, p. 1093-1096.

Comparison of wettability of Fe by synthetic and foundry slags. Determining the boundary angles of the wettability of metal by slag. Tables, graphs, diagrams. 9 ref.

10475* Economizing on the Ferromanganese in the Melting of Steel. **O oszczędność żelazomanganu przy wytapianiu stali.** (Polish.) L. Andrejew. *Hutnik,* v. 22, no. 1, 1955, p. 30-32.

Less loss of Mn results from addition of ferromanganese to the teeming ladle instead of to the open-hearth furnace. Chemical analyses and mechanical properties presented for steels thus deoxidized. Graphs, tables.

10476* Device for Measuring the Dynamic Pressure in Blast Furnace Tuyères. **Urządzenie do pomiaru ciśnienia dynamicznego w dyszach wielkiego pieca.** (Polish.) A. Maślanka. *Hutnik,* v. 22, no. 3, Mar. 1955, *Biuletyn Informacyjny, Instytutów Ministerstwa Hutnictwa,* v. 6, no. 3, 1955, p. 10-12.

Design; operation; measurement of temperature and blast flow. Diagrams, table.

10477* Blast Furnace Bears Under Indian Operating Conditions. H. Schrader and T. V. Cherian. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 27–43+1 plate; disc., p. 43.

Results of a thorough investigation of a bear removed from a blast furnace of 900 tons daily capacity and dismantled after a campaign of 9½ yr. Diagrams, tables, photographs, graphs. 18 ref.

10478* Production of Low-Carbon Ferro-Chrome. A. B. Chatterjea, G. P. Contractor, and B. R. Nijhawan. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 45-57; disc., p. 57-60.

Attempts to produce, in one operation, a ferro-chrome using ferro-silicon made in India. Tables, graphs. 22 ref.

10479* Preparation of Titanium by Kroll's Process. R. Manocha, P. P. Bhatnagar, and T. Banerjee. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 81-94.

Results obtained on the investigations carried out for determining the optimum condition for the production of Ti. Diagrams, tables. 8 ref.

10480* Desiliconization of Blast Furnace Hot Metal. J. Pearce. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 251-258.

Principle advantages of keeping low and constant Si contents in the hot metal supply for basic open-hearth furnaces and the various processes of desiliconization are discussed. Diagram. 17 ref.

10481 Continuous Casting of Steel. J. S. Morton. *Iron & Steel,* v. 28, May 1955, p. 167-171.

Technical problems; plant procedures. Diagrams, table, graph. 4 ref.

10482 Gas-Turbo-Driven Blower. C. E. Sayer. *Iron & Steel,* v. 28, May 1955, p. 225-233.

An analysis and evaluation of two European gas turbine plants used in blast-furnace service. Graphs, diagrams.

10483 Furnace Bunching. R. Solt. *Iron & Steel,* v. 28, May 1955, p. 233-235.

A method of assessment of charging delays. Table, graphs, diagrams.

10484 Rapid Method of Relining a Blast Furnace. Bruno Vezzani. *Iron and Steel Engineer,* v. 32, May 1955, p. 111-117; disc., p. 117-118.

The unusually fast performance of relining this blast furnace was accomplished primarily because of excellent advance planning and wholehearted cooperation between the various groups on the job—as a result, relining of furnace was accomplished in the short time of 15 days 9½ hrs. Tables, diagrams.

10485* Swedish Shale as Raw Material for Uranium. **Svensk skiffer som uranråvara.** (Swedish.) Erik Svenke. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning,* v. 26, no. 3, 1955, p. 75-80.

Amount of U that can be extracted from Swedish shale and principal flowsheet for U production from shale. Diagram, tables, photograph. 1 ref.

10486* Behavior of Sulfur in Gases During Melting in a Blast Furnace. **Povedenie sery v gazakh pri plavke v domennoi pechi.** (Russian.) I. S. Kulikov and L. M. Tsylev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 12, Dec., p. 102-119.

Metals—Extraction and Refining

Survey of studies attempting thermodynamic analysis of this problem; S in various reactions, and collation of equations of change of free energies; temperature relation. Tabels, graphs. 14 ref.

10487* Determination of the Activity of Iron Oxide in Molten Slags by the Method of Electromotive Forces. **Opredelenie aktivnosti zakisi zheleza v rasplavlennykh shlakakh metodom elektrodvizhushchikh sil.** (Russian.) O. A. Esin, B. M. Lepinskikh, and V. I. Musikhin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 12, Dec., p. 120-127.

Thermodynamic properties of CaO-FeO-SiO_2 melts. Method investigated avoids laborious chemical analysis. Change of isobar potential. Phase diagram, tables, graphs. 13 ref.

10488* Influence of the Circulation of Coke on the Burning Process in Blast Furnaces. **Vliianie tsirkuliatsii koksa na protsess goreniia v domennyk pechakh.** (Russian.) I. P. Bardin, M. Ia. Ostroukhov, L. Z. Khodak, and L. M. Tsylev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 1, Jan., p. 80–95+1 plate.

Conditions of operation; changing composition of gases in the various zones of the furnace, and the effect of blast conditions. Diagrams, tables, graphs, photographs. 12 ref.

10489 Experimental Production of Al-Si Alloys in a Three-Phase Furnace. Lloyd H. Banning and William F. Hergert. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 630-633.

Advantages of a smelting technique utilizing hogged wood waste as part of the reductant and for temperature control are discussed. Tables. 13 ref.

10490 Hydrometallurgy of Copper-Zinc Concentrates. Hidesaburo Kurushima and Suketoshi Tsunoda. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 634-638.

Recovery of both the Cu and Zn by roasting in a fluidized bed. Tables, flowsheet.

10491 Topochemical Aspects of Iron Ore Reduction. Gust Bitsianes and T. L. Joseph. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 639-645.

The topochemical behavior of reduction was studied in six types of ores of different origin, composition, and physical structure. Micrographs, graph. 16 ref.

10492 Evolution in Steel Melting. E. C. Wright. *Metal Progress*, v. 67, June 1955, p. 100-101.

Some technical and economic consideration that have directed attention to the disadvantages of the basic open-hearth furnace operation.

10493* The German Lead Smelters. C. W. Jensen. *Mining Magazine*, v. 92, May 1955, p. 265-277.

Review of equipment, practice, and processes. Tables.

10494* Contribution to the Study of Silicate Inclusions in Killed Steel. **Contribution a l'étude des inclusions silicatées dans les aciers calmés.** (French.) R. Collée. *Revue universelle des mines*, v. 11, ser. 9, Apr. 1955, p. 151-156.

A new hypothesis concerning the formation of silicate inclusions. Experimental proof. Micrographs, tables. 23 ref.

10495* The Control of the Basic Converter Process by Utilizing the Thermal Radiation of the Bath and the Spectrum of the Converter Flame. **Die Überwachung und Steuerung des Thomasverfahrens durch Auswertung der Temperaturstrahlung des Bades und des Spektrums der Konverterflamme.** (German.) Franz Wever, Walter Koch, Horst Höfermann, Bernd Alexander Steinkopf, Helmut Knüppel, Karl Ernst Mayer, and Gert Wiethoff. *Stahl und Eisen*, v. 75, no. 9, May 5, 1955, p. 549-559.

Control of the reaction process by means of the temperature and spectrometer curve. Diagrams, graphs, micrographs. 10 ref.

10496 Special Pig Irons for the Pacific Northwest. John P. Walsted. *U. S. Bureau of Mines, Report of Investigations* 5120, Apr. 1955, 14 p. (TN21 Un3r)

Small-scale tests have demonstrated that pig iron of any desired composition may be made by proper proportioning of the smelter charge, using materials available in this region. Tables. 2 ref.

10497 Manganese From Steel-Plant Slags by a Lime-Clinkering and Carbonate-Leaching Process. I. Laboratory Development. R. August Heindl, J. A. Ruppert, M. L. Skow, and J. E. Conley. *U. S. Bureau of Mines, Report of Investigations* 5124, Apr. 1955, 98 p. (TN21 Un3r)

Laboratory tests justify the feasibility of recovering a high-grade manganese oxide and that the process be expanded to pilot plant scale. Graphs, tables, flowsheets, diagrams, photograph. 5 ref.

METALS—FINISHING, POLISHING, AND CLEANING

10498* Pickling and Etching Aluminum. **Beizen und Ätzen der Aluminium-Werkstoffe.** (German.) A. Blankbeizen. *Aluminium Ranshofen, Mitteilungen*, v. 3, no. 1, Feb. 1955, p. 3-4.

Procedures, bath compositions, temperatures, and times of pickling and etching Al and its alloys.

10499* Electrolytic Polishing of Large Metallographic Specimens. **Elektrolityczne polerowanie dużych szlifów metalograficznych.** (Polish.) J. Ogerman. *Hutnik*, v. 22, no. 3, Mar. 1955; *Biuletyn Informacyjny, Instytutów Ministerstwa Hutnictwa*, v. 6, no. 3, 1955, p. 9-10.

Specimens of steels of 6 to 15 sq. cm. area were polished with consideration given to temperature, current density, and polishing time; comparison of electrolytic and mechanical polishing. Micrographs, table.

10500 Metallographic Polishing of Cast Iron. L. E. Samuels. *Iron and Steel Institute, Journal*, v. 180, May 1955, p. 23-25 + 2 plates.

Modification of a general method of metallographic polishing based on the use of diamond abrasives. Micrographs. 8 ref.

10501* Electropolishing "Nimonic 80". K. F. Lorking. *Metal Finishing*, v. 53, May 1955, p. 64-66.

Conditions of optimum electrolyte composition, current density, cell voltage, and temperature have been established. Micrograph, graphs, table. 6 ref.

METALS—FOUNDRY PRACTICE

10502 Light Iron Castings and the New Die Pressing Process. R. S. M. Jeffrey. *American Foundryman*, v. 27, May 1955, p. 88-95.

Die pressing process for gutters and other castings produces low-cost, gray-as-cast iron in mechanized permanent molds. Tables, photographs, micrographs, diagrams. 10 ref.

10503 Stopping Blow-By in Core Boxes. Richard L. Olson. *American Foundryman*, v. 27, May 1955, p. 101-103.

Design of blow box with continuous dike-type seal. Photographs.

10504 Foundry Noise and Its Control. Herbert T. Walworth. *American Foundryman*, v. 27, May 1955, p. 104-109.

Review of some of the technical factors of industrial noise exposures and some practical approaches to its control. Graphs, diagrams. 6 ref.

10505* Experiments on the Granulation of Cast Iron and Pig Iron. **Versuche über das Granulieren von Gusseisen und Roheisen.** (German.) R. Mitsche and E. M. Onitsch-Modl. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 100, no. 3, Mar. 1955, p. 121-126.

Methods of producing Fe granules and shot; effects of test conditions on size and shape of the granules. Photographs, tables, diagram.

10506* Pinholing in Nodular Iron Castings. J. Gittus. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Apr. 1955, p. 594-603 + 4 plates.

Defect appears to be most pronounced in greensand-molded castings and can be alleviated both by additions of carbonaceous materials to the mold and by small additions to the metal of Al, Te, and Bi. A Ce addition is made to cancel any harmful effect due to these latter elements. Tables, diagrams, micrographs, photographs. 1 ref.

10507* Sinking Under Bosses on Thin Plates: Preliminary Experiments on Foundry Variables. I. C. H. Huches. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Apr. 1955, p. 616-627 + 4 plates.

Effects of melting and pouring temperatures, inoculation with ferro-silicon, molding practice and design variables upon sinking. Tables, photographs, graphs.

10508 Indirect Arc Furnace Reduces Costs With Rapid, Efficient Melting. O. P. Toneguzzo. *Canadian Metals,* v. 18, May 1955, p. 29, 32.

Equipment and operating details of furnace used for nonferrous metals.

10509* Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 34, May 1955, p. 111-112.

Melting procedures for Cu alloys and cast iron. Table. (To be continued.)

10510 Automated Molding Line. Robert H. Herrmann. *Foundry,* v. 83, June 1955, p. 74-80.

Production methods for automated and semiautomated molding lines, as well as related foundry sections of a gray iron foundry. Photographs, diagrams.

10511 The CO_2 Process. Its Use in British Foundries. Arnold Tipper. *Foundry,* v. 83, June 1955, p. 84-90.

Methods and equipment for making cores and molds using sodium silicate binders hardened by carbon dioxide gas. Photographs, table, diagram.

10512 Molding Simplified by Change in Pattern. William Ferguson. *Foundry,* v. 83, June 1955, p. 91.

Improved pattern design permits easier withdrawal of cast stainless steel extractor screw. Photograph.

10513 New Plant Helps Promote Die Casting Quality. Kenneth L. Mountain. *Foundry,* v. 83, June 1955, p. 100-103.

Description of plant equipment and operating procedures. Photographs.

10514 Strainer Core—Types and Applications. *Foundry,* v. 83, June 1955, p. 123-124, 127.

Advantages; dimensions; selection criteria. Photograph, diagram, table.

10515 Trouble Shooting. Designing a Small Cupola. C. W. Ammen. *Foundry,* v. 83, June 1955, p. 128 + 4pages.

Determination of dimensions, equipment, and construction features. Diagrams.

10516 Carbon-Dioxide Process. D. V. Atterton. *Foundry Trade Journal,* v. 98, May 12, 1955, p. 505-511; disc., p. 511-514.

Determining optimum additions of binder from the point of view of strength by varying binder content when gassing cores for a constant time. Photographs, diagrams, graphs.

10517* The Adhesion of the Lead Bearing Alloy Overlay With the Steel Back. **Soudrznost vystelky ze slitiny olova s opernou ocelovou pánví.** (Czech.) Vladimír Suchánek. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 221-228.

Effects of variations in alloy composition, temperature of the bearing metal and that of the steel shell, and the rate and direction of cooling. Photographs, graphs, micrographs, diagrams, tables. 7 ref.

10518 Carbon and Alloy Steel Castings. *Iron & Steel,* v. 28, May 1955, p. 189-194.

Description of plant and operating procedures of a British foundry. Photographs, diagrams. (To be continued.)

10519* Behavior of Zinc in Blast Furnaces. **O povedenii tsinka v domennykh pechakh.** (Russian.) A. L. Zagianskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 96-108.

Harmful effects of Zn; zoning and peculiarities of formation of ZnO; growth of the refractory lining; reactions of Zn in connection with the melting of materials containing Zn. Table. 25 ref.

10520* Melting in a Cupola Furnace With a Chemically Basic Lining. **Plavka v vagranke s osnovnoi futerovke.** (Russian.) L. I. Levi. *Liteinoe Proizvodstvo,* 1955, no. 4, Apr., p. 3-8.

Desulfuration and dephosphorization processes; chemical composition and temperature of the cast iron; use of O in the blast. Tables, graphs. 7 ref.

10521* Feeding of Steel Castings Being Prepared by the Investment Casting Process. **Pitanie stal'nykh otlivok, izgotovliaemykh po vyplavliaemym modeliam.** (Russian.) M. L. Khenkin. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 1-6.

Pouring and teeming systems with feeding of castings from risers, cylindrical and circular collectors, and special heads; relation of casting dimensions to riser and feeder dimensions and design; avoidance of brittleness, settling cracks, and other defects. Diagrams, graphs, table, nomograms. 6 ref.

10522* Machine for Pressure Casting Non-Ferrous-Metal Parts. **Stanok dlia lit'ia pod davleniem melkikh detalei iz tsvetnykh splavov.** (Russian.) D. M. Nabrodov and L. M. Sobolev. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 10-11.

Design specifications and operational characteristics of press and heater. Diagrams.

10523* Experiment in the Modification of Cast Iron by Mg. **Iz opyta modifitsirovaniia chuguna magniem.** (Russian.) S. I. Vitenson, R. S. Tripol'skaia, and R. I. Galaiko. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 18-19.

Chemical composition and specific wt. of slags formed under different conditions of modification; use of various fluxes; chemical composition of different zones of the metal. Micrographs, photograph, tables.

10524 Die Lubricants—Facts and Fancies. H. K. Barton. *Machinery (London),* v. 86, Apr. 29, 1955, p. 925-930.

Purposes of lubricants, substances used, application and direct effect of release agents are discussed. Photograph.

10525 Rothfischer Centrifugal Iron Pipe Casting Machines. *Machinery (London),* v. 86, May 13, 1955, p. 1034-1036.

Design of machine for casting water main pipes of various thicknesses. Photographs.

10526 Cast Bolts for Pipe Joints. C. K. Donoho. *Metal Progress,* v. 67, May 1955, p. 86-88.

Cast bolts are mass-produced in metal molds with short-cycle annealing; nuts are gray iron, shell molded. Photographs, micrograph, diagram.

10527 Engineering Design Opportunities in Castings. (Digest of A.S.M. Lecture Course, "Why Castings", by Hans J. Heine; Presented before the Louisville, Ky., Chapter, Mar. 1955.) *Metal Progress,* v. 67, June 1955, p. 148, 150, 152.

A discussion of engineering design opportunities in castings. Includes choice of casting accuracy, finish, mechanical properties, and alloys used.

10528* Colloidal Graphite in the Foundry. W. A. Mader. *Modern Metals,* v. 11, May 1955, p. 40-41.

Unique properties make "dag" dispersions ideal as chill coatings, mold wash, high temperature lubricants, and parting compounds. Photographs.

10529 Die Castings for Machine Parts. David Laine. *Tool Engineer,* v. 34, June 1955, p. 79-80.

Die-cast machine components results in lower wt., reduced production, and lower assembly costs because of the one-piece construction inherent in the die-casting process. Photographs.

10530* Investment Casting Gets Nod as Cost Saver for Parts. James B. Price. *Western Metals,* v. 13, May 1955, p. 49-51.

Metals—Foundry Practice

Precision casting equipment and procedures; advantages and applications. Photographs.

METALS—HEAT TREATMENT

10531 Viewpoints on the Linde Method of Stress Relieving. R. Gunnert. *British Welding Journal*, v. 2, May 1955, p. 200-204.

Effectiveness of the method in reducing transverse stresses and the extent to which longitudinal stresses can be reduced. Graphs, table. 11 ref.

10532* Contribution to the Structure of Layers Treated by Means of Electric Sparks. **Příspěvek ke struktuře elektrojiskrově zpevněných vrstev.** (Czech.) Miroslav Čermák. *Hutnické Listy*, v. 10, no. 4, Apr. 1955, p. 215-221.

Best treatment of steel surface will result when using electrodes made from sintered TiC and WC. Tables, graphs, micrographs. 7 ref.

10533* Interoperational Annealing of 13% Cr Stainless Steel. **Wyżarzanie międzyoperacyjne stali nierdzewnej 13% Cr.** (Polish.) Z. Wójcik. *Hutnik*, v. 22, no. 2, Feb. 1955; *Biuletyn Informacyjny, Instytutów Ministerstwa Hutnictwa*, v. 6, no. 2, 1955, p. 5-7.

Isothermal annealing; dilatometric and metallographic investigations. Heat treatment on laboratory and quasi-industrial scale. Micrographs, graphs, tables.

10534* Some Considerations on the Action of Energisers in Solid Carburising Agents. H. Schrader. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 61-78; disc., p. 78-80.

Composition of solid carburizing agents and the types of common additions used for energizing. Tables, graphs. 11 ref.

10535* Heat Treating Precision Equipment for Aircraft. Frank Crahen. *Industrial Gas*, v. 33, May 1955, p. 5-7, 24.

Versatile batch type furnaces provide part and process flexibility required for heat treating about 800,000 lb. of precision electrical, hydraulic, and mechanical components on job-lot basis. Photographs.

10536 Continuous Car Bottom Furnaces. Walter J. Assel. *Industrial Heating*, v. 22, Apr. 1955, p. 732 + 4 pages.

Continuous car bottom vs. roller hearth, rotating hearth, and pusher type furnaces. Photographs.

10537 Salt Bath Furnace Performs Four Different Operations. E. W. Kerman. *Iron Age*, v. 175, May 19, 1955, p. 124-126.

First intended for carburizing only, is now doing three other jobs—simultaneous brazing and carburizing, brazing, and hardening. Photographs.

10538 New Gear Shaper Cuts All External Teeth Simultaneously. *Iron Age*, v. 175, May 26, 1955, p. 98-99.

Equipment is versatile, highly accurate, and designed for tooling changes in 25 to 45 min. Photographs.

10539* Laboratory Workshop Practice. VI. Heat Treatment of Steels. A. Thompson. *Laboratory Practice*, v. 4, May 1955, p. 202-206.

In the laboratory the open-hearth method is generally used for the hardening of small tools because of its cheapness and comparative convenience. Tables, diagrams.

10540* Nitriding of Magnesium Cast Iron. **Azotirovanie magnievogo chuguna.** (Russian.) V. D. Iakhnina. *Liteinoe Proizvodstvo*, 1955, no. 4, Apr., p. 23-25.

Corrosion tests; porosity; brittleness; microhardness; depth of nitrided layer. Heat treatment of nitrided metal. Graphs, micrographs, tables. 4 ref.

10541 Heat Treating Aluminum Alloy Aircraft Parts—A Builder's Viewpoint. R. H. Gassner. *Metal Progress*, v. 67, June 1955, p. 75-79.

How metallurgical principles dictate the requirements of heat treating equipment for wrought Al alloys. Graphs, photographs.

10542 An Alloy Manufacturer's Viewpoint. K. B. Baker. *Metal Progress*, v. 67, June 1955, p. 80.

A discussion of the need for adequate heating and cooling equipment in heat treating Al and Mg alloy parts.

10543 Furnaces for Heat Treating Aluminum and Magnesium. D. W. Pettigrew. *Metal Progress*, v. 67, June 1955, p. 81-83.

Four major factors influence design of furnaces for heat treatment of Al and Mg: temperature control, heat input, material handling, and atmosphere requirements. Present high production rates have increased the importance of material handling. Photographs, diagram.

10544 Salt Bath Furnaces for Aluminum. Bernard P. Planner. *Metal Progress*, v. 67, June 1955, p. 84-86.

Salt baths offer many advantages for heat treatment of Al-aircraft alloys, including high treating rates, close temperature control, and freedom from atmosphere attack. Graphs, diagram, table, photograph.

10545 Surface Protection of Titanium and Stainless Steel During Heat Treatment. Horace Drever. *Metal Progress*, v. 67, June 1955, p. 87-90.

Vacuum furnaces have proved successful in preventing embrittlement of Ti during annealing. Extremely dry H is being used successfully in both bright hardening and bright annealing of stainless steels. Photographs, table.

10546 Controlled-Atmosphere Furnaces. Carl L. Ipsen. *Metal Progress*, v. 67, June 1955, p. 91-95.

A survey of the representative types of controlled-atmosphere furnaces, their advantages and major fields of application. Photographs.

10547* Using Dew Point for Automatic Control of Heat Treatment Atmospheres. Peter Trippe. *Metalworking Production*, v. 99, May 13, 1955, p. 861-863.

Recently developed system to facilitate automatic control of furnace atmosphere in heat treatment processes by detecting and controlling the dew point and therefore the carbon potential. Photographs, graphs.

10548* Interrupted Quench Hardening of Steel. **Het warmbadharden van staal.** (Dutch.) C. H. Luiten. *Smit Mededelingen*, v. 10, no. 1, Jan.-Mar. 1955, p. 26-32.

After discussion of a no. of practical applications when hardening high-speed steel, hot-work steel, and low-alloyed steel, a survey is given of different hot-quenching baths. Particular attention is paid to a saltbath with built-in propeller-agitator, cooler, and special saltstrainers. Graphs, photographs. 17 ref.

10549* Prevention and Correction of Defective Pieces During the Heat Treatment of Cutting Tools. **Preduprezhdenie i ispravlenie braka pri termicheskoi obrabotke rezhushchikh instrumentov.** (Russian.) I. E. Khelimskii and Z. I. Fel'dshtein. *Stanki i Instrument*, v. 26, no. 3, Mar. 1955, p. 22-25.

Quenching and annealing treatments; welding of cutting tools; weld inspection methods. Tables, diagrams.

10550 Annealing Control Makes the Difference. Edward J. Moritz. *Steel*, v. 136, May 23, 1955, p. 104-105.

Roller-hearth furnace assures uniform high quality electrical steel. Annealing costs are no higher than those of former batch-furnace method. Photograph, flowchart.

10551 Tunnel Furnace Is Low-Cost Annealer. *Steel*, v. 136, May 30, 1955, p. 78.

By designing out overhead cranes and special, car-return mechanism, a lightweight metal building was sufficient. Car bottoms hold 1400 lb. per linear ft. of hearth. Photographs.

10552 Fast Quench Reduces Heat Treat Distortion. George Perkins and H. D. Bitner. *Tool Engineer*, v. 34, June 1955, p. 108-110.

Use of the slat quench technique to solve problems of distortion of heat treated parts. Photographs.

10553* Strengthening of Machine Parts by the Electrode-Spark Method. **Uprochnenie detalei mashin elektroiskrovym sposobom.** (Russian.) L. A. Mirkin. *Vestnik Mashinostroeniia*, v. 35, no. 4, Apr. 1955, p. 48-51.

Electrodes used; hardness and wear-resistance of surfaces hardened; advantages. Graphs, table, diagram.

10554* New Methods of Heat Treatment and Chemico-Thermal Treatment of Metal in Salt Baths. **Novye metody termicheskoi i khimiko-termicheskoi obrabotki metalla v rasplavlennykh soliakh.** (Russian.) A. I. Zot'ev. *Vestnik Mashinostroeniia*, v. 35, no. 5, May 1955, p. 67-71.

Review of reports on bright dip, bright annealing, variations of the wire patenting process, sulfiding, and use of carnallite as heating and cooling media.

10555* Gas Carburizing. L. G. W. Palethorpe. *Wild-Barfield Heat-Treatment Journal*, v. 5, Mar. 1955, p. 8-12.

Theory; equipment; procedures. Graph, micrographs. 7 ref.

10556 Heat Treatment and Finishing Operations in the Production of Copper and Aluminium Rod and Wire. I. H. J. Miller. *Wire Industry*, v. 22, May 1955, p. 495, 498-500, 502.

Influence of early processing operations on the properties of the final product. Copper wire annealing furnaces and methods. Table, graph.

10557* Vertical Heat Treatment Furnaces for Metal Bands. **Vertikal-Glühöfen für Metallbänder.** (German.) Friedrich C. L. Eisenmenger. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 264-268.

Description and structural details. Diagram, photographs.

See also:

10742 (heat treatment of steel forgings)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

10558 The Role of Crystal Structure in Irradiation Effects in Metals. (English.) D. Wruck and C. Wert. *Acta Metallurgica*, v. 3, no. 2, Mar. 1955, p. 115-120.

Report on a series of measurements made on Fe, Co, and Ni. Diagrams, tables, graphs. 3 ref.

10559 Internal Friction in Solid Solutions of Oxygen-Tantalum. (English.) R. W. Powers. *Acta Metallurgica*, v. 3, no. 2, Mar. 1955, p. 135-139.

Study to determine if the relative width of a damping curve depends in any manner on the peak height or interstitial atom concentration. Table, diagram, graphs. 8 ref.

10560 A Uniaxial Strain Model for a Lüder's Band. (English.) E. W. Hart. *Acta Metallurgica*, v. 3, no. 2, Mar. 1955, p. 146-149.

A model is proposed to explain the load-elongation test behavior for a wide range of types of materials which exhibit yield point phenomena in one form or another. Graphs. 7 ref.

10561 Twinning and Accommodation Kinking in Zinc. (English.) A. J. W. Moore. *Acta Metallurgica*, v. 3, no. 2, Mar. 1955, p. 163-169.

Examples are described and compared with metallographic sections of the same twins, and their possible importance in the development of the twin is discussed. Diagrams, micrographs, graphs. 16 ref.

10562 Calorimetric Measurements During Precipitation in a Gold-Nickel Alloy. (English.) J. Nyström. *Acta Metallurgica*, v. 3, no. 2, Mar. 1955, p. 182-185.

The heat of precipitation in an alloy in the Au-Ni system was measured and compared with calculated values obtained from the heat of mixing, and the kinetics of the transformation were studied. Diagram, graphs. 14 ref.

10563 Testing Fatigue Life of Skin Panels. Edward Schiff. *Aero Digest*, v. 70, May 1955, p. 42, 44, 46.

Simple water pressure system yields rapid cyclicization of specimen and provide automatic cutoff at failure. Diagram, photographs.

10564 Lithium: Heat Content From 0 to 900°, Triple Point and Heat of Fusion, and Thermodynamic Properties of the Solid and Liquid. Thomas B. Douglas, Leo F. Epstein, James L. Dever, and William H. Howland. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2144-2150.

Vacuum distilled Li is studied from 298.16 to 1200 K. Tables, graphs, diagram. 41 ref.

10565 Statistico-Mechanical Theory of Deformation, Involving the Activated State. W. James Lyons. *American Journal of Physics*, v. 23, May 1955, p. 268-275.

Relative concentration of activated units; specific rate of transfer; equation for rate of deformation. Diagram, graphs. 17 ref.

10566* Magnetic Susceptibility Measurements of Germanium Between Room Temperature and Liquid Hydrogen Temperatures. A. van Itterbeek, L. de Greve, and W. Duchateau. *Applied Scientific Research*, v. 4, sec. B, no. 4, 1955, p. 300-308.

Experimental method and apparatus; description of samples. Diagrams, graphs, table. 3 ref.

10567* Heat Treatment Practice in Relation to the Dimensional Stability of Steel. N. J. Sheppard. *Australasian Engineer*, 1955, Mar., p. 46-56.

Factors affecting dimensional stability in case-hardening, gaseous nitriding, and induction hardening processes are outlined. Photograph, graphs, diagrams, tables. 48 ref.

10568* Investigation of the Basic Parameters of the Wear of Gears. **Issledovanie osnovnykh parametrov iznosa shlitsevykh soedinenii.** (Russian.) G. I. Skundin. *Avtomobil'naia i traktornaia promyshlennost'*, 1955, no. 4, Apr., p. 9-12.

Factors include effect of dust, non-parallelism of grooves, warp and crumpling stresses, period of operation, and hardness of gear-slots. Photographs, tables.

10569 Experimental Extrusion of Aluminum Cable Sheath at Bell Telephone Laboratories. G. M. Bouton, J. H. Heiss, and G. S. Phipps. *Bell System Technical Journal*, v. 34, May 1955, p. 529-561.

New techniques for extruding directly over paper insulated cable core at low temperature and pressure. Graphs, micrographs, diagrams, photographs, table. 8 ref.

10570* The Effect of Trace Impurities on the Properties of Iron. N. P. Allen. *Birmingham Metallurgical Society, Journal*, v. 35, Mar. 1955, p. 169-180.

Experimental results, and discussion of the brittleness of iron and its alloys. Graphs, tables, photographs.

10571* Tensile and Fatigue Tests on Hardened and Tempered Nodular Irons. G. N. J. Gilbert and K. B. Palmer. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Apr. 1955, p. 604-605 + 5 plates.

Tensile results on bars tempered between 600 and 400 C for times up to 4 hr., and unnotched and notched fatigue results on specimens tempered for 2 hr. at 600 and 550 C. Tables, micrographs, graphs, diagrams. 11 ref.

10572* The Relation Between Brittle Behavior and the Strength and Structure of Materials. F. J. Hiorns. *British Coal Utilisation Research Association, Monthly Bulletin*, v. 19, Feb. 1955, p. 49-60.

Review of work relating to the factors affecting the breakage of solids, particularly those in a brittle state. Graph, table. 104 ref.

10573 Effect of Low Temperature on the Stability of Permanent Magnets. A. G. Clegg. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 120-123.

Magnetometer measurements were made of the change in magnetization with temperature between +60 and −60 C on Alcomax III, Columax, Alnico, and 35 and 15% Co steels. Graphs, tables. 3 ref.

10574 The Cracking of Layers of Brittle Material by Differential Strains. D. J. Millard. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 124-127.

Crack patterns due to shrinkage in three dimensions; experimental study of crack patterns; summary of theoretical conclusions. Graphs, table. 7 ref.

10575 The Resistivity of Thin Metallic Films. D. E. Clark. *British Journal of Applied Physics*, v. 6, May 1955, p. 158-160.

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Comparison of the resistivities of Sb and Bi films at microwave frequencies with the values measured by d.c. Tables, diagram, graphs. 4 ref.

10576 Assessment of Spot-Weld Quality by Torsion Test. P. Joumat and J. E. Roberts. *British Welding Journal*, v. 2, May 1955, p. 225-233.

Experiments, comparing a torsion test with other methods of assessing quality in low-alloy and plain carbon steel, show that an inspection of the torsion failure gives sufficient information to evaluate weld quality for service without need for mechanical measurements. Tables, graphs, photographs, diagrams.

10577* Problem of Temperature Dependence of Surface Tension of Metals. **K voprosu o temperaturnoi zavisimosti poverkhnostnogo natiazheniia metallov.** (Russian.) S. N. Zadumkin. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 507-509.

Mathematical treatment. Table. 19 ref.

10578* Theory of Small Elasto-Plastic Deformations of Anisotropic Media. **K teorii malykh uprugo-plasticheskikh deformatsii anizotropnykh sred.** (Russian.) I. I. Gol'denblat. *Doklady Akademii Nauk SSSR*, v. 101, no. 4, Apr. 1, 1955, p. 619-622.

Mathematical analysis. 2 ref.

10579* Elastic Twinning of Metals. **Ob uprugom dvoinikovanii metallov.** (Russian.) V. I. Startsev and V. M. Kosevich. *Doklady Akademii Nauk SSSR*, v. 101, no. 5, Apr. 21, 1955, p. 861-864.

Alternating application and removal of varying stresses or bending, and the occurrence of elastic twins; intergranular lattice damage. Micrographs. 6 ref.

10580* Test of Corrugated Steel Pipe Culvert at Cullman, Alabama. *Engineer*, v. 199, May 6, 1955, p. 646-647.

Tests on an 84-in. diameter Armco "Multi-Plate" culvert situated under 137 ft. of fill. Results indicate that such pipe can readily be used under high fills provided that the structure is properly back-filled. Photographs, diagram, graph.

10581 Creep-Relaxation Testing. Tests at Constant Strain and Decreasing Load. John H. M. Draper. *Engineering*, v. 179, May 6, 1955, p. 564-565.

Method of maintaining constant strain; test procedures; effect of loading at different rates and temperatures. Diagram, graphs. 1 ref.

10582 Short-Time Creep Relaxation Tests. Effect of Methods of Loading. S. J. Watson. *Engineering*, v. 179, May 6, 1955, p. 565-566.

Four creep-relaxation tests were carried out, all at 660 C and all with a strain of 0.153% (corresponding to a stress of 20 tons per sq. in. at 20 C.) but differing in the way in which the strain was applied. Diagrams, graphs.

10583* Fatigue Life of Steel I-Beams at Normal and Sub-Zero Temperatures. J. Dubuc, Jr., T. A. Monti, and George Welter. *Engineering Journal*, v. 38, May 1955, p. 607-614, 626.

Testing apparatus described, and behavior of each type of beam under a series of fatigue flexure tests are related. Photographs, diagrams, graphs.

10584 Mechanical Properties of Cast Titanium-Aluminum-Silicon Alloys. H. W. Antes and R. E. Edelman. *Foundry*, v. 83, June 1955, p. 92-95.

Effect of Si on mechanical properties Ti-Al. Silicon additions up to 1% were made to both 4 and 6% Al-Ti alloys. In both series of alloys, an increase of about 4000 psi. was realized for each 0.1% of Si added. Micrographs, diagram, tables, graphs. 7 ref.

10585* Application of Micro-Structure Analysis for Technology of Plastic Magnesium Alloys. **Použití analysy mikroroentgenem k studiu výroby tvářených slitin hořčíku.** (Czech.) Petr Skulari. *Hutnické, Listy*, v. 10, no. 4, Apr. 1955, p. 209-215.

Advantages of micro-structure analysis for technology of plastic Mg alloys and the influence of hexagonal lattice on the mechanical and technological characteristics of these alloys. Diagrams, graphs, table. 6 ref.

10586* High-Alloy Steels With Nitrogen Addition. **Stale wysokostopwe z dodatkiem azotu.** (Polish.) Adam Semkowicz. *Hutnik*, v. 22, no. 1, 1955, p. 8-12.

Variations in heat treatment; strength, hardness, and resistance to corrosion and chemical reagents of Cr-Ni steels with and without N. Tables, micrographs, graphs. 9 ref.

10587* The Use of Free Energy Maps in Extractive Metallurgy. S. N. Anant Narayan. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 105-121; disc., p. 121-122.

Principles and applications of the diagrams of standard free energies of formation of metallic compounds. Graphs. 20 ref.

10588* The Determination of the Elastic Constants of Metals by an Ultransonic Method. E. G. Ramachandran and N. Srinivasan. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 173-188; disc., p. 259-260.

Elastic constants of polycrystalline metals as well as of single crystals of metals have been determined. Photographs, diagrams, tables. 8 ref.

10589 Inhomogeneous Deformation in Rolling and Wire-Drawing. B. B. Hundy and A. R. E. Singer. *Institute of Metals, Journal*, v. 83, May 1955, p. 401-407.

Relation of the degree of inhomogeneity to the conditions of working. Tables, graphs, diagram. 25 ref.

10590 Deformation and Annealing Textures in Thorium. R. E. Smallman. *Institue of Metals, Journal*, v. 83, May 1955, p. 408-416 + 1 plate.

Describes work on the deformation and annealing textures, which are of interest both from a practical and a theoretical standpoint. Diagrams, tables, graphs. 34 ref.

10591 Some Observations on the Creep of Pre-Strained Aluminium. G. R. Wilms. *Institute of Metals, Journal*, v. 83, May 1955, p. 427-432 + 2 plates.

Changes which occur in the structure during subsequent creep deformation under constant tensile load at various temperatures. Graphs. 17 ref.

10592 A Preliminary Note on the Creep Properties of Internally Oxidized Copper Alloys. J. W. Martin and G. C. Smith. *Institute of Metals, Journal*, v. 83, June 1955, p. 417-420 + 1 plate.

The creep properties of single-crystal and polycrystalline specimens were determined with, and without, a dispersen oxide phase. Graphs. 7 ref.

10593 Rare Earths Improve Impact Properties of 4330. H. Schwartzbart and J. P. Sheehan. *Iron Age*, v. 175, May 26, 1955, p. 103-106.

Rare earths can increase toughness without affecting hardness. Table, graphs.

10594 Brittle Fracture. T. S. Robertson. *Iron & Steel*, v. 28, May 1955, p. 161-166.

Test methods; theory; mechanism of fractures. Photographs, graphs.

10595 Variable Creep Strength. W. E. Bardgett and M. G. Gemmill. *Iron & Steel*, v. 28, May 1955, p. 239-242.

The creep strength results of basic open-hearth mild steel, killed with varying amounts of aluminum, show the importance of the (residual) soluble aluminum content of the solid steel as a control factor. Graphs, tables.

10596 Creep and Rupture. J. Glen. *Iron & Steel*, v. 28, May 1955, p. 242-252.

Some additional data on Mo, Cr-Mo and Mo-V steels. Graphs, tables.

10597 Precision-Cast High Temperature Alloy. G. T. Harris and H. C. Child. *Iron & Steel*, v. 28, May 1955, p. 252-255.

Statistical study of creep and fatigue properties. Graphs.

10598 Creep and Tensile Properties. A. Graham and K. F. A. Walles. *Iron & Steel*, v. 28, May 1955, p. 255-263.

Relationships for a commercial alloy. Tables, graphs.

10599 Rate of Heat Absorption of Steel. Fred S. Bloom. *Iron and Steel Engineer*, v. 32, May 1955, p. 64-74; disc., p. 74-76.

By combining time lag and Stefan-Boltzmann's law, a practical and simplified method is developed for calculating the rate of heat absorption and time-temperature relation. Tables, graphs, diagram.

10600 Fatigue Tests on Rolled Alloy Steels Made in Electric and Open-Hearth Furnaces. P. H. Frith. *Iron and Steel Institute, Journal*, v. 180, May 1955, p. 26-33 + 3 plates.

Longitudinal and transverse reversed bending fatigue properties were obtained for basic electric-arc and acid open-hearth steels. Tables, micrographs.

10601* Poisson's Ratio in the Plastic Range. **O koeffitsiente Puassona v plasticheskoi oblasti.** (Russian.) A. M. Zhukov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 12, Dec., p. 86-91.

Correlation of work of various experimenters on determination of Poisson's ratio of Al and steel at 350 and 750 C. Graphs, table. 12 ref.

10602* Peculiarities of the Deformation of Monocrystalline and Polycrystalline Copper During High-Temperature Heating in a Vacuum. **Osobennosti deformatsii monokristallicheskoi i polikristallicheskoi medi pri vysokotemperaturnom nagreve v vakuume.** (Russian.) M. G. Lozinskii and S. G. Fedotov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 12, Dec., p. 92-96.

Effect of grain size on strength; "viscous" behavior of grain boundaries; effect of temperature on crystal orientation and hardness. Micrographs, graphs, diagram. 8 ref.

10603* The Goldhammer Effect in Alloys of a Ternary System of Iron, Nickel, and Cobalt. **Effekt Gol'dgammera v splavakh troinoi sistemy zheleza, nikelia i kobal'ta.** (Russian.) N. V. Grum- Grzhimailo. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1954, no. 12, Dec., p. 137-139.

Relation of relative variations of electric resistance, under the influence of a longitudinal magnetic field, to the electronic states of the outer orbits. Table, phase diagram. 5 ref.

10604* Strength and Plasticity of Metals at Low and Extremely Low Temperatures. **Prochnost' i plastichnost' metallov pri nizkikh i ves'ma nizkikh temperaturakh.** (Russian.) G. V. Uzhik. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 1, Jan., p. 57-66.

Variations resulting in shearing strength; plastic deformation; twinning, etc. Graphs, diagrams, table. 7 ref.

10605* Internal Friction of Steel in Relation to Temper (Thermal) Brittleness. **Vnutrennee trenie stali pri otpusknoi (teplovoi) khrupkosti.** (Russian.) E. I. Kvashnina and V. I. Prosvirin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 1, Jan., p. 157-159.

Effect of heating at 500 C high-temperature heating of brittle steel; high-temperature tempering and subsequent heating at 500 C; effect of Mo on steel. Graphs. 3 ref.

10606 Fracture of Inoculated Iron Under Biaxial Stresses. I. Cornet and R. C. Grassi. *Journal of Applied Mechanics*, v. 22, June 1955, p. 172-174.

Data on the fracture of inoculated-iron thin-wall tubes were investigated under various ratios of axial to tangential stress, ranging from pure tension to pure compression. Data are consistent with published data on gray cast iron. Diagrams, graph. 7 ref.

10607 The Formation of a Conical Crater in a Thin Plastic Sheet. W. T. Thomson. *Journal of Applied Mechanics*, v. 22, June 1955, p. 175-176.

Deformation of a thin plastic sheet forced by a conical mandrel. Diagram, graphs.

10608 Propagation of Shock Waves in Aluminum. H. Dean Mallory. *Journal of Applied Physics*, v. 26, May 1955, p. 555-559.

Velocity of shock waves and associated translational motions, produced by metal-metal impact, were determined by an electrical contact technique. Results obtained were used to evaluate an equation of state for the metal. Tables, graphs, diagram. 6 ref.

10609 Internal Friction of an Alloy of 16 Percent Aluminum in Iron. C. Wert. *Journal of Applied Physics*, v. 26, May 1955, p. 640-641.

Reports some measurements of internal friction of "16-Alfenol". Graph. 4 ref.

10610 On Unsymmetrical Extrusion in Plane Strain. A. P. Green. *Journal of the Mechanics and Physics of Solids*, v. 3, Apr. 1955, p. 189-196 + 3 plates.

Slip-line fields proposed and extrusion pressures calculated for extrusion through a square-die, situated at either end or in the side of a container with smooth or rough walls. A plastic-rigid non-hardening material is assumed. Plasticine experiments reveal the deformation and confirm the theory. Photographs, diagrams, graph, table. 3 ref.

10611 X-Ray Microbeam Studies of Brittle Fractures of Metals. Lo-ching Chang. *Journal of the Mechanics and Physics of Solids*, v. 3, Apr. 1955, p. 212-217 + 1 plate.

Examination of polycrystalline Fe and Zn reveals that the plastic strain associated with brittle fracture of both metals can be resolved into two parts; the prefracture strain and the fracture strain. Photograph, graphs, table. 8 ref.

10612 Extrusion Through Wedge-Shaped Dies. I-II. W. Johnson. *Journal of the Mechanics and Physics of Solids*, v. 3, Apr. 1955, p. 218-230.

Experimental data of the steady-state pressure for the direct extrusion of sheet under strain conditions through square and wedge-shaped dies. Variation of extrusion pressure with friction, for selected reductions of small angle dies. Diagrams, graphs. 7 ref.

10613 Viscous Flow of Copper at High Temperatures. A. L. Pranatis and G. M. Pound. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 664-668.

Copper foils, of varying thickness and grain size, were measured under such conditions of low stress and high temperature and it is believed that creep was predominately the result of interboundary diffusion. Tables, diagram, graphs. 26 ref.

10614 Curie Temperatures of Binary and Ternary Sigma Phases. M. V. Nevitt and P. A. Beck. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 669-674.

Correlation of the Curie temperature with composition may be described qualitatively in terms of the contributions of the various component at. moments to the saturation moment of the alloy. Tables, diagram, graphs. 20 ref.

10615 Effect of the Structure of Dislocation Boundaries on Yield Strength. Jack Washburn. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 675-681.

Effect of dislocation boundaries on flow stress under the following experimental conditions; substantially pure shear deformation, and boundaries of controlled angle, orientation, and no. Diagrams, photographs, graphs, micrographs. 15 ref.

10616 Creep Deformation of Magnesium at Elevated Temperatures by Nonbasal Slip. A. R. Chaudhuri, H. C. Chang, and N. J. Grant. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 682-688.

Tests were run at 500 and 700 F at stresses of 148 to 786 psi. Based on these measurements and theoretical calculations, the crystallographic elements for nonbasal slip were determined. Micrographs, diagrams, tables. 12 ref.

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10617* Researches on the Fatigue Under Consideration of the Phenomenon of Elastic Hysteresis. Minoru Kawamoto and Kunio Nishioka. *Kyoto University, Memoirs of the Faculty of Engineering*, v. 17, no. 1, Jan. 1955, p. 1-29.

Relation between stress and strain on the metallic material subjected to the reversed stress and the condition of fatigue limit; effect of shape of cross section of specimen on fatigue limit; relation between the form and notch factors. Diagrams, graphs, tables. 22 ref.

10618 Directional Properties in Aluminium. P. Grodzinski. *Light Metals*, v. 18, May 1955, p. 155-156.

Use of elongated indenters for determination of hardness variations in Al single crystals. Diagrams, graphs, micrograph. 6 ref.

10619* Investigation of the Mechanical Properties of White Cast Iron and the Stresses in It. **Issledovanie mekhanicheskikh svoistv belogo chuguna i napriazhenii v nem.** (Russian.) L. I. Kozhinskii. *Liteinoe Proizvodstvo*, 1955, no. 4, Apr., p. 19-22.

Modulus of elasticity and bending strength determinations. Effects of C content and other constituents. Diagrams, graphs, tables, micrographs. 4 ref.

10620* Cast Copper Antifriction Steels. **Liteinye medistye antifriktsionnye stali.** (Russian.) A. A. Lunev. *Liteinoe Proizvodstvo*, 1955, no. 5, May, p. 15-18.

Effect of lubricants, Cu coatings, and various heat treatments on the coefficient of friction of Cu-Al steel. Other bearing metals and combinations were also tested. Micrographs, graphs, tables, phase diagram. 13 ref.

10621 Modified 18:8 Stainless for Higher Temperatures. *Materials & Methods*, v. 41, May 1955, p. 117-118.

Use of non-strategic metals to replace Ni. Effects of various modifying elements on mechanical properties at elevated temperatures. Photographs, table.

10622 Fatigue and the Comet Disasters. Tom Bishop. *Metal Progress*, v. 67, May 1955, p. 79-85.

Brief summary of the engineering and metallurgical tests carried out to determine the cause of the accidents. Photographs, graph, diagram.

10623 Hydrogen Embrittlement of Titanium Alloys. Harris M. Burte, Eugene F. Erbin, George T. Hahn, Ralph J. Kotfila, John W. Seeger, and Donald A. Wruck. *Metal Progress*, v. 67, May 1955, p. 115-120.

Embrittlement was observed in the laboratory at levels as low as 150 p.p.m. Tables, graphs.

10624 Brittle Failure of Steel Structures—Theory, Practice, Future Prospects. M. E. Shank. *Metal Progress*, v. 67, June 1955, p. 111-121.

Some of the important theoretical and experimental developments in the field of inquiry, along with some views on present engineering design and fabrication practice and the future possibilities. Micrographs, diagrams, graphs. 28 ref.

10625 Radiolytic-Gas Bubbling Improves Convective Heat Transfer in Supo. Franklin P. Durham. *Nucleonics*, v. 13, May 1955, p. 42-46.

Experimental heat-transfer data and order-of-magnitude analyses of the effect on heat-transfer coefficient of fluid agitation caused by bubble evolution are given. Photograph, graphs, table. 8 ref.

10626* Investigation of the Wear Resistance of Modified Cast Iron in Laboratory and Railway-Operation. **A módosított öntöttvas kopásállóságának laboratóriumi és vasútüzemi vizsgálata.** (Hungarian.) Ferenc Varga and Endre Füle. *Öntöde*, v. 6, no. 4, Apr. 1955, p. 85-91.

Wear resistance of CaSi modified cast iron as compared to the ordinary and Fe-Si modified types; improvements in wear resistance. Micrographs.

10627 The Magnetic Moments of Cobalt-Copper Alloys. J. Crangle. *Philosophical Magazine*, v. 46, 7th ser., no. 376, May 1955, p. 499-513.

The rate of change of atomic moment with electron concentration for the high-temperature face-centered cubic form of the solid solution of copper in cobalt was derived from measurements on the variation of spontaneous magnetization of suitable alloys with temperature. Graphs, tables. 13 ref.

10628 Hysteresis of the Angle of Contact of Mercury Against Steel. D. J. Wright. *Physical Society, Proceedings*, v. 68, no. 425B, May 1955, p. 297-303.

Problems undertaken were to investigate how the hysteresis of the angle of contact varied with adsorption from the atmosphere in which the solid was placed, and to attempt some qualitative experiments on the effects of roughness. Diagram, graph, tables. 16 ref.

10629* Structure, Mechanical Behavior, and Standardization of Gary Cast Iron in the Light of a Brivariant System. **Die Strukur, das mechanische Verhalten und die Normung des Graugusses in Lichte eines divarianten Systems.** (German.) A. Collaud. *Schweizer Archiv für angewandte Wissenschagt und Technik*, v. 21, no. 4, Apr. 1955, p. 105-117.

Relation between structure and mechanical properties. Tables, diagrams.

10630 The Value of Hardness Testing as Inspection Procedure. W. G. Shilling. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 373-377; disc., p. 377-384.

Practical aspects of the tests and their application by inspectors. Photographs, table, graph, histograms.

10631* Transformation and Segregation Phenomena in Austenitic Chromium-Nickel Steels at Elevated Temperatures. **Umwandlungs- und Ausscheidungsvorgänge in austenitischen Chrom-Nickel-Stählen bei erhöhten Temperaturen.** (German.) Ewald Baerlecken and Walter Hirsch. *Stahl und Eisen*, v. 75, no. 9, May 5, 1955, p. 570-579.

Effect of C, Si, Mn, Mo, Cb, N, Ti, and V contents on the structure, magnetic saturation, notch toughness, hardness, and resistance to grain disintegration in a boiling copper sulfate–sulphuric acid solution after an annealing treatment of up to 18,500 hr. at 600 to 850 C. Tables, micrographs, graphs. 34 ref.

10632 Effect of Pressure on Thermal Conductance of Contact Joints. Martin E. Barzelay, Kin Nee Tong, and George F. Holloway. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3295, May 1955, 52 p. (TL570 Un3t)

Tests were conducted to determine factors influencing thermal conductance across interface formed between stationary plane surfaces of 75S-T6 Al-alloy and AISI Type 416 stainless-steel blocks. Graphs, diagrams, tables. 2 ref.

10633 Friction, Wear, and Surface Damage of Metals as Affected by Solid Surface Flims. Edmond E. Bisson, Robert L. Johnson, Max A. Swikert, and Douglas Godfrey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3444, May 1955, 60 p. (TL570 Un3t)

Results of investigations, from 1946 to 1954, are consistent with theoretical predictions that solid surface flims of low shear strength can serve to reduce both friction and surface damage, with metallic oxides having very marked effects. Graphs, diagrams, micrographs, tables. 48 ref.

10634 On the Recovery of Electrical Resistance of Cold-Worked Gold. Charles J. Meechan and Herman M. Dieckamp. *U. S. Nuclear Engineering and Manufacturing, NAA-SR-1159*, 1955, 17 p. (UF767 Un3.1na)

Recovery performance in the temperature range 100 to 200 C and the determination of the activation energy associated with the process. Graphs, diagrams, tables. 9 ref.

10635 Use of the Instron Tensile Testing Machine to Observe Resistance Recovery. Herman M. Dieckamp and Charles J. Meechan. *U. S. Nuclear Engineering and Manufacturing, NAA-SR-MEMO-1107*, 1955, 17 p. (UF767 Un3.1na)

Observation of resistivity recovery in cold-worked and irradiated metals. Diagrams, graph.

10636* Optical Properties of Metals. **Opticheskie svoistva metallov.** (Russian.) V. L. Ginzburg and G. P. Motulevich. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 4, Apr. 1955, p. 469-535.

Reflection from metal surfaces; surface impedance and dielectric properties. Graphs, diagrams, tables. 64 ref.

10637* Analysis and Application of Certain Criteria of Creep. **Analiz i primenenie nekotorykh kriteriev polzuchesti.** (Russian.) I. A. Oding and V. S. Ivanova. *Vestnik Mashinostroeniia*, v. 35, no. 5, May 1955, p. 62-66.

Values of coefficients of long-range strength and of creep for several steels. Factors affecting plasticity and "reserve" properties, and their relation to the period of service before fracturing. Tables, graphs.

10638 Fatigue Aspects in Aircraft Welding Design. J. Koziarski. *Welding Journal*, v. 34, May 1955, p. 446-458.

Weld residual stresses and stress concentrations and their effects on fatigue failure of the welds; weld design criteria. Photographs, micrographs, tables, diagrams. 77 ref.

10639 The Static and Fatigue Behavior of Spot-Welded Joints in Titanium. W. H. Kearns, W. S. Hyler, and D. C. Martin. *Welding Journal*, v. 34, May 1955, p. 241S-250S.

Spot-welded joints in tension-shear tests were stronger than similar joints in stainless steel and Al alloys. They were also stronger in fatigue tests as compared with Al alloys but somewhat lower than stainless steel. Tables, diagrams, graphs. 4 ref.

10640* The Deformability of Anodically Oxidized Pure Aluminum. **Über die Umformbarkeit von anodisch oxydiertem Reinaluminium.** (German.) Walther Köhler. *Werkstoffe und Korrosion*, v. 6, no. 4, Apr. 1955, p. 169-180.

Influence of various coating-methods on the deformability of anodically oxidized semifinished products and the tendency of the oxide layers to crack under tensile stresses and wear conditions. Graphs, micrographs, tables, photographs. 32 ref.

10641* Electric Resistance and Plastic Deformation of Metals. **Elektrischer Widerstand und plastische Deformation von Metallen.** (German.) Hendrik Gerard van Bureren. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 272-282.

Relation between resistance and lattice defects; experimental data compared with theory; effect of heat treatment. Tables, graphs. 53 ref.

10642* Investigation of the Thermoelectrical Properties of Bismuth Telluride. **Issledovanie termoelektricheskikh svoistv telluristogo vismuta.** (Russian.) R. M. Vlasova and L. S. Stil'bans. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 569-576.

Effect of temperature on conductivity and Hall effect of electronic and vacancy types. Analysis of test methods. Circuit diagrams, graphs, table, diagrams. 5 ref.

10643* Thermoplastic After Effect in Metals. **Termoplasticheskoe posledeistvie v metallakh. I.** (Russian.) N. N. Davidenkov and D. M. Vasil'ev. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 671-679.

Dilatometric measurements on steels during heating. Relation of magnitude of after effect to C content, impurities, and previous heat treatment. Graphs, tables, diagram. 4 ref.

10644* Relation of Rate and Relaxation Coefficients of Aluminum to the Rate of Plastic Deformation. **O zavisimosti skorostnogo i relaksatsionnogo koeffitsientov aliuminiia ot skorosti plasticheskoi deformatsii.** (Russian.) L. I. Vasil'ev. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 687-690.

Experimental data. Explanation of regularities observed. Graphs. 4 ref.

10645* Nernst-Ettingshausen Thermomagnetic Effect in Tellurium. **O termomagnitnom effekte Nernsta-Ettingsgauzena v tellure.** (Russian.) A. Z. Daibov and I. M. Tsidil'kovskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 742-746.

Relation of N.-E. effect to temperature and to concentrations of electrons and holes. Equations. Graphs. 4 ref.

10646* Effect of Impurities on the Mechanism of the Electroconductivity of AlSb. **O vliianii primesei na mekhanizm elektroprovodnosti AlSb.** (Russian.) A. R. Regel' and M. S. Sominskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 768-770.

Effect of atoms of Sn, Pb, As, Bi, Se, and Te on rectifying properties. Table, graph. 10 ref.

See also:
9852 (fatigue of aircraft frames)
10730 (properties of steel castings)
10771 (measurement of metal hardness)

METALS—MECHANICAL WORKING

10647 Cope Talks on Draw Dies. XXVIII. Drawing Dies for Stainless Require Modifications. Stanley R. Cope. *American Machinist*, v. 99, May 23, 1955, p. 130-132.

To avoid scratches and score marks on deep-drawn stainless steels or nickel alloys, choose die materials with suitable characteristics. Diagrams.

10648* Continuous Blank Machining in Gear Production. J. J. McCabe. *Automation*, v. 2, June 1955, p. 26-29.

Precision boring using parts handling mechanisms and gage actuated tool setting controls. Photographs, diagram.

10649 Automated Setup for Handling of Workpieces in Ford Transmission Plant. *Automotive Industries*, v. 112, June 1, 1955, p. 68-69, 122, 124.

Equipment and procedures for automatic control of machine tools for production of gears and shafts. Photographs, diagram.

10650 Machining Hard Materials by Ultrasonics. *Canadian Metals*, v. 18, May 1955, p. 45-46.

Equipment and operating procedures. Diagram, table, photograph.

10651* The Study of Forgeability. **Étude de la forgeabilité.** (French.) Very. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 12, no. 4, 1955, p. 783-800.

Control of forgeability of stainless and high-temperature steels, and a new type of testing equipment for determining forgeability. Photographs, tables, diagrams.

10652* The Grinding of Steel. XXV. Grinding and Finishing Machines. *Edgar Allen News*, v. 34, May 1955, p. 109-110.

Description, operating techniques, and capabilities of internal grinding machines. Photograph. (To be continued.)

10653 Cold Extrusion Marches On. II. Materials, Lubrication, Tooling, Pressures and Production Information. James M. Leake. *Finish*, v. 12, June 1955, p. 39-40, 86, 88.

Review of advantages and processes.

10654* Change of Tube Wall Thickness in Drawing. **Změna tloušťky stěny trubek při průvlečném tahu.** (Czech.) Bohumil Počta. *Hutnické Listy*, v. 10, no. 4, Apr. 1955, p. 194-200.

Results show that the change of wall thickness depends on the ratio between wall thickness and tube diameter before drawing. Table, graphs, diagrams.

10655* The Principles of Fastening Dies in Hammers. **Zasady zamocowania matryc w młotach.** (Polish.) Wiesław Wróblewski. *Hutnik*, v. 22, no. 1, Jan. 1955, p. 13-20.

Designs of drop hammers and dies, types of locking arrangements, wedges, and inserts. Design factors consider function, size of hammer, strength of blow, hardness, and types of steel. Diagrams, tables. 6 ref.

10656* Electrospark Treatment of Wire-Drawing Dies Made of Sintered Carbides. **Obróbka elektroiskrowa ciągadeł do drutu ze spiekanych węglików.** (Polish.) Zygmunt Steininger. *Hutnik*, v. 22, no. 3, Mar. 1955, p. 87-89.

Design of electrospark machining equipment. Use and operation of the device and its advantages over mechanical polishing methods. Diagrams, circuit diagram, photograph, table. 17 ref.

10657* Application of Statistical Methods to Gauge Control in Rolling Aluminium Sheets. T. Bose. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 137-143.

Control of gauge variation at final rolling stage. Tables, diagrams.

10658 Electronic Consideration in the Theory and Design of Electric Spark Machine Tools. Everard M. Williams and James B. Woodford, Jr. *Institute of Radio Engineers, Transactions on Industrial Electronics*, PGIE-2, Mar. 1955, p. 78-81.

Metals—Mechanical Working

Discussion of the process used, dielectric, type of pieces machined, and techniques of current generation. Photographs, circuit diagram. 3 ref.

10659 Cold Reduction Facilities at Fairless Works. Robert R. Shedd. *Iron and Steel Engineer*, v. 32, May 1955, p. 55-62; disc., p. 62-63.

Plant layout; operating economies; equipment details. Diagrams, tables, photographs.

10660 Plate Mill Design and Rolling Practice. Elmer Lynch. *Iron and Steel Engineer*, v. 32, May 1955, p. 91-95; disc., p. 95-96.

Plate mill consist of a 24 x 36 x 116-in., three-high rougher and a 36 x 54 x 130-in., four-high finishing mill; slabs are kept in process in both mills simultaneously; some plates can be finished on the three-high mill and the combination gives excellent operating flexibility. Tables, photographs.

10661 Characteristics of Tandem Mill Drives. R. G. Beadle. *Iron and Steel Engineer*, v. 32, May 1955, p. 97-102; disc., p. 102-103.

Developments in electrical equipment. Comparison of two magnetic amplifier systems. Diagrams, graphs, table.

10662 Screwdown Lubrication. William A. Holt. *Iron and Steel Engineer*, v. 32, May 1955, p. 119-120; disc., p. 120-121.

Use of lead naphthenate lubricants on rolling mill screwdown screws and nuts.

10663 Induction Heating of Ingots Proved Practical for Rolling. M. C. D. Hobbs. *Iron and Steel Engineer*, v. 32, May 1955, p. 123-124, 126, 129.

Induction heating and materials handling equipment for rolling mill. Photographs, diagram, table.

10664 Cold Working of Metals. J. G. Wistreich. *Iron and Steel Institute, Journal*, v. 180, May 1955, p. 51-59.

Particular importance is attached to the concept of tool-stock configuration and its role in determining the properties of end products, tool loads, and machine size. Diagrams, micrographs, graphs. 23 ref.

10665 Wire-Drawing Machines for Steel Wire. H. Richards. *Iron and Steel Institute, Journal*, v. 180, May 1955, p. 60-65.

Survey of the types of wire-drawing machine used in the United Kingdom. Possible future developments towards increased speed and efficiency are outlined.

10666 Problems of Forging Aluminium. *Machinery Lloyd (Overseas Ed.)*, v. 27, May 7, 1955, p. 93-95.

Maintaining internal stresses at a minimum value by quenching in water with temperature above 85 C. Diagrams, photographs, graphs.

10667 G.F.M. Precision Forging Machines. *Machinery (London)*, v. 86, May 13, 1955, p. 1028-1030.

Hot forging machine for forming the flutes in carbon steel and high-speed steel taps ranging from 3/8 to 1 9/16 in. diameter. Photographs.

10668 Developments in the Grinding of Polygon Profiles. *Machinery (London)*, v. 86, May 13, 1955, p. 1031-1033.

By the adjustment of an eccentric, any radius of curvature, within the range provided, can be obtained on the profile. Photographs, diagrams.

10669 The Care of Diamond Wheels. J. I. Jenkinson. *Machinery (London)*, v. 86, May 13, 1955, p. 1045-1046.

Review of some truing and cleaning methods. Photographs.

10670 Arc-Cast Molybdenum—Ingot to Bar, Sheet or Wire. N. L. Deuble. *Metal Progress*, v. 67, May 1955, p. 89-92.

Workability of ingots is determined largely by the molybdenum melting process. Photographs.

10671 Two Decades of Progress in Drop Forging. H. J. Merchant. *Metal Treatment and Drop Forging*, v. 22, May 1955, p. 211-218.

Review of the developments and advances made in the forging industry. Photographs, diagrams. 15 ref. (To be continued.)

10672 Procedures for Forming Stainless Steel Tubing. *Metal-Working*, v. 11, June 1955, p. 14-16.

Methods of forming, reducing, expanding, flaring, and rolling threads. Diagrams, photographs.

10673* Small Hydraulic Pistons Replace Die Springs and Pressure Pads. Ben C. Brosheer. *Metalworking Production*, v. 99, Apr. 29, 1955, p. 760-763.

Use in press dies. Constant pressure of exactly the desired amount is secured both during the stroke and over a long period of use. Photographs, diagrams, tables.

10674* How to Understand Cold Working of Metals. Samuel Storchheim. *Metalworking Production*, v. 99, May 13, 1955, p. 845-851.

Metallurgical facts in reference to effects of prior processing on the metal, its grain structure, and work-hardening rate. Graphs, photographs, micrographs, tables.

10675* "Start From Scratch" Savings. Howard E. Jackson. *Modern Industrial Press*, v. 17, May 1955, p. 13 + 7 pages.

Description of a compact and highly efficient steel fabricating unit. Photographs.

10676* Coated Abrasive Machines in Close Tolerance Work. A. W. Bell. *Modern Machine Shop*, v. 28, June 1955, p. 106-109.

Outstanding production applications of coated abrasive machinery capable of removing metal rapidly to extremely exacting tolerances. Photographs.

10677* New Die Storage Facilities Save Factory Space. Gilbert C. Close. *Modern Machine Shop*, v. 28, June 1955, p. 110-115.

Operation and advantages of a new method of storing and handling machine tool dies. Photographs.

10678* New Machine Extends Thread Rolling Process. *Modern Machine Shop*, v. 28, June 1955, p. 128-131.

Two-roll design principle is applicable to wide range of workpieces. Photograph, diagrams.

10679* Giant Forge Presses Go Into Action. *Modern Metals*, v. 11, May 1955, p. 84, 86, 88.

Description of large hydraulic units for production of Al aircraft forgings. Photographs, diagram.

10680* Forged and Stamped Parts of Aluminum Alloys. **Les pièces frogées et matricées en alliages d'aluminium. II.** Forging. **La forge.** (French.) Robert Colomb. *Revue de l'aluminium*, v. 32, no. 219, Mar. 1955, p. 281-296.

Techniques for A-U4G, A-S12UN, and A-U2GN alloys of different structural parts and their mechanical characteristics. Tables, diagrams, photographs.

10681* Lubricants for Wiredrawing. A. L. H. Perry. *Scientific Lubrication*, v. 7, May 1955, p. 14-18.

Advances have required improved drawing lubricants, and future increases in drawing speeds likewise largely depend on improving lubricants still further. Photographs. 5 ref.

10682* Reclamation of Used Oils. V. Cutting Oils and Coolants. E. G. Ellis. *Scientific Lubrication*, v. 7, May 1955, p. 19-25.

Treatment of cutting oils and coolants and the disposition and treatment of swarf. Photographs, diagrams.

10683 An Inverted-Type Piercing Die to Produce Angular Holes. W. M. Halliday. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 330-333, 338.

Design and advantages. Diagrams.

10684 Sectional Dies. Federico Strasser. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 339-343, 384.

Some aspects of their design, construction, and use. Diagrams.

10685 Milling Goes Chemical. *Steel*, v. 136, May 16, 1955, p. 120-121.

Used for jobs on which mechanical milling is slow or difficult. Photographs.

10686 Shot Peening for Safety. *Steel,* v. 136, May 23, 1955, p. 102-103.

Improving the fatigue strength of materials at points of greatest stress. Photographs.

10687 Upset Forgings. Modern Methods and Design. I. M. W. Lamprecht. *Steel Processing,* v. 41, May 1955, p. 295-304.

Discusses use of forged products; steps to be followed in manufacturing dies; single and multiple operations; high explosive shell cases. Table, diagrams.

10688 The Design of Simple Dies for Bending Operations. W. M. Halliday. *Steel Processing,* v. 41, May 1955, p. 311-314, 331.

Problems of the tool designer concerning questions of die-design and construction; the particular principles of bending action to be employed; what portions of the component shape are to be reproduced in each die; how many dies have to be used; and how such tooling or production costs may be maintained as low as possible. Diagrams.

10689 Slow Speed Sawing—Reports on a Growing Technique. *Steel Processing,* v. 41, May 1955, p. 317-318.

Inexpensive box strapping and clock spring material will cut stainless steels, mild steels, and Ti. Photographs.

10690 Ceramic Tools Machine Steel Fast. W. B. Kennedy and Bennett Bovarnick. *Tool Engineer,* v. 34, June 1955, p. 71-75.

Design of a new type toolholder; methods of grinding ceramics; geometry of ceramic tools. Photographs, diagrams, tables.

10691 Wet Machining of Cast Iron Increases Tool Life. John A. Boyd. *Tool Engineer,* v. 34, June 1955, p. 81-82.

Best current solution to cast-iron machining problems is the use of a high-wetting and dispersing water soluble with special rust-inhibiting additives. Photographs.

10692 How to Select and Use Die Steels. *Tool Engineer,* v. 34, June 1955, p. 97-99.

Some of the important considerations in choice of die materials. Diagrams, tables.

10693 Analysis of Ear Formation in Deep-Drawn Cups. Arthur J. McEvily, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3439, May 1955, 7 p. (TL570 Un3t)

A method for predicting earing behavior is proposed, based on the plastic properties of single crystals and a knowledge of the preferred orientation of the blank material. Proposed method of prediction is in agreement with reported experimental results. Graphs, diagrams. 7 ref.

10694* Automatic Regulation of Cutting Speed in Relation to the Temperature of the Cutting Edge of the Cutter. **Avtomaticheskoe regulirovanie skorosti rezaniia v zavisimosti ot temperatury rezhushchei kromki reztsa.** (Russian.) P. N. Malakhov. *Vestnik Mashinostroeniia,* v. 35, no. 4, Apr. 1955, p. 26-30.

Description of automatic apparatus and circuit, mode of operation, and its testing for industrial use. Circuit diagram, graphs, photograph table. 2 ref.

10695* High-Speed Cutting With Large Feeds. **Skorostnoe rezanie s bol'shimi podachami.** (Russian.) A. E. Gel'fand, G. N. Chernavskii, and S. B. Futorian. *Vestnik Mashinostroeniia,* v. 35, no. 5, May 1955, p. 43-47.

Geometric parameters of cutting part of tool. Chip safety. Rigidity of lathes and vibrations. Face milling. Graphs, diagrams, tables.

10696* Economic Efficiency of the Induction Heating of a Metal During Drop Forging on Crank-Driven Presses. **Ekonomicheskaia effektivnost' induktsionnogo nagreva metalla pri shtampovke na krivoshipnykh pressakh.** (Russian.) V. S. Bialkovskaia. *Vestnik Mashinostroeniia,* v. 35, no. 5, May 1955, p. 72-77.

Comparison of costs of induction heating and flame heating under various conditions and for various machine parts. Oil, natural gas, and producer-gas costs. Tables, graph.

10697 Mechanization Applied to Oxygen Cutting. R. L. Deily. *Welding Journal,* v. 34, May 1955, p. 433-439.

Automatic material handling equipment and electrical controls for routine high quantity production of precision work. Photographs, graphs.

10698* Derivation of the Criterion of Interaction of Electrode Substances During the Electrospark Finishing of Metals. **Vyvod kriteriia vzaimodeistviia veshchestv elektrodov pri elektroiskrovoi obrabotke metallov.** (Russian.) G. V. Gusev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 763-765.

Physical constants of the electrodes and parameters of the impulse electrical discharge. 5 ref.

See also:

10641 (plastic deformation of metals)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

10699 Growth of Cadmium Iodide Crystals. (English.) John B. Newkirk. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 121-125 + 1 plate.

Microscopic studies of step-by-step crystal formation and growth. Photographs, micrographs, diagrams, graph. 3 ref.

10700 The Segregation of Carbon in Iron Single Crystals as Studied by Torsion Pendulum Damping. (English.) F. W. Kunz. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 126-129.

Describes a series of experiments on the effect of quenching and straining on the segregation of C in single crystals of α-Fe. Graph. 8 ref.

10701 Grain Boundary Diffusion in a Body-Centered Cubic Lattice. (English.) C. W. Haynes and R. Smoluchowski. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 130-134.

Investigation of the possible variation of grain boundry diffusion where the orientation of the crystals formed the boundary. Table, graph, radiograph, diagrams. 20 ref.

10702 Mechanism of Pore Formation Associated With the Kirkendall Effect. (English.) J. A. Brinkman. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 140-145.

A mechanism is proposed by which the tensile stress can nucleate voids of a critical size or larger. Diagram. 13 ref.

10703 Determination of Sub-Structures in Metal Single Crystals by Means of X-Rays. **Détermination des sous-structures dans les monocristaux métalliques à l'aide des rayons X.** (French.) H. Lambot, L. Vassamillet, and J. Dejace. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 150-156.

The method is capable of revealing essentially perfect subgrains whose size is of the order of tens of microns and whose mutual disorientation is at least of the order of 1-min. of arc. Photographs. 28 ref.

10704 On the Diffusion of Oxygen Through Solid Iron. (English.) J. L. Meijering. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 157-162.

Study of the existence of intergranular diffusion of O though Fe was made in an A atmosphere. Micrographs, graph. 27 ref.

10705 Effect of Grain Boundaries Upon Formation and Dimensional Changes During Diffusion. (English.) R. W. Balluffi and L. L. Seigle. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 170-177.

Study of the effect of grain-boundary configuration upon structural and shape changes in dezincified brass. Table, graphs, micrographs. 22 ref.

10706 The Mechanisms of Self-Diffusion in Tin. (English.) J. F. Nicholas. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 178-181.

Experimental data for self-diffusion in tin are analyzed in terms of six possible diffusion mechanisms. Tables, graph, diagram. 8 ref.

10707 Frictional Forces on Dislocation Array at the Lower Yield Point in Iron. (English.) A. Cracknell and N. J. Petch. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 186-189.

Metals—Metallography, Transformations, and Structures

A linear relationship is calculated between σ_0 and the concentration of C + N in solution, and this is confirmed by experimental measurements. Table, graphs. 16 ref.

10708 X-Ray Line Broadening From Cold-Worked Iron. (English.) R. I. Garrod and J. H. Auld. *Acta Metallurgica*, v. 3, no. 2, Mar. 1955, p. 190-198.

Measurements from cold-worked Fe filings, and from wire specimens prestressed by uniaxial tension to various stages in the plastic range, were analyzed in terms of both line breaths and line shapes for a number of high angle reflections. Diagram, tables, graphs. 28 ref.

10709 The Compound Na_3Pb_4. Ivar T. Krohn, R. C. Werner, and Hymin Shapiro. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2110-2113.

Sodium-lead equilibrium diagram was restudied by thermal and microscopic analysis. Table, phase diagram. 14 ref.

10710* Indication of the Presence of Structural Imperfections in the "Sub-Grains" in Metal Crystals. **Mise en évidence des imperfections de structure dans les "sous-grains" des cristaux métalliques.** (French.) Aurel Berghezan and Jean Hérenguel. *Comptes rendus*, v. 240, no. 14, Apr. 4, 1955, p. 1536-1537.

Micrographic study of arrangement of the substructure of monocrystals of strongly cold-worked Al with 3% Mg in solid homogeneous solution and its evolution during annealing at low temperature. 3 ref.

10711* X-Ray Investigation of Initial Stages of the Breakdown of a Supersaturated Solution of a δ-Solid Solution of Ag-Al. **Rentgenovskoe issledovanie nachal'nykh stadii raspada peresyshchennogo δ-tverdogo rastvora Ag-Al.** (Russian.) A. M. Elistratov. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 473-476 + 1 plate.

Experimental data about structural changes in crystals of a supersaturated solid solution of Ag in Al (δ-phase); three stages involved; gamma-phase. Diffraction patterns. 10 ref.

10712* Quantitative Investigation of the Distribution of Elements in Alloys. **Kolichestvennoe issledovanie raspredeleniia elementov v splavakh.** (Russian.) S. T. Kishkin, S. Z. Bokshtein, L. M. Moroz, and T. I. Gudkova. *Doklady Akademii Nauk SSSR*, v. 101, no. 4, Apr. 1, 1955, p. 667-670.

Distribution of W or Cb in Ni; relation of micro-nonhomogeneity to rate of crystallization, plastic deformation, heat treatment, and alloy composition. Graphs, micrograph. 5 ref.

10713* Kinetics of the Isothermal Martensite Transformation in the Vicinity of Absolute Zero. **O kinetike izotermicheskogo martensitnogo prevrashcheniia vblizi absoliutnogo nulia.** (Russian.) B. Ia. Liubov and Iu. A. Osip'ian. *Doklady Akademii Nauk SSSR*, v. 101, no. 5, Apr. 11, 1955, p. 853-856.

Effect of energy of at. vibrations on process rate; classical and quantum effects at low temperatures. Table, graph. 7 ref.

10714* Diagram of the Recrystallization of Iodide-Processed Titanium. **Diagramma rekristallizatsii iodidnogo titana.** (Russian.) E. M. Savitskii, M. A. Tylkina, and A. N. Turanskaia. *Doklady Akademii Nauk SSSR*, v. 101, no 5, Apr. 11, 1955, p. 857-859 + 1 plate.

Micro-structures after cold rolling and tempering at various temperatures; optimum range for obtaining fine-grained recrystallization structure of α-modification. Phase diagram, micrographs.

10715 The Influence of Lattice Vibrations on the Order-Disorder Transitions of Alloys. C. Booth and J. S. Rowlinson. *Faraday Society, Transactions*, v. 51, Apr. 1955, p. 463-467.

Statistical theory of order-disorder transitions is modified to include the energy of the thermal vibrations of the atoms. Graph. 6 ref.

10716* Diffusion Coefficient of Al in Fe for Solid Solution Range. **Koeficient difuse hliníku v železe pro oblast tuhého roztoku.** (Czech.) Pavel Gröbner. *Hutnické Listy*, v. 10, no. 4, Apr. 1955, p. 200-202.

An equation is calculated for the diffusion coefficient of Al in Fe for the temperature range 950 to 1100 C. Diagram, graphs, micrgraph, tables. 9 ref.

10717* Phase Transformations in Cu-Al and Cu-Al-Ni Alloys and Their Influence on Hardness. **Fázové přeměny u slitin Cu-Al a Cu-Al-Ni a jejich vliv na tvrdost.** (Czech.) Karel Toman. *Hutnické Listy*, v. 10, no. 4, Apr. 1955, p. 202-209.

Phase relations and the structure of stable and metastable phases of the two systems are described. Graphs, diagrams, micrographs. 5 ref.

10718* Contemporary Views on the Dispersion Hardening of Metal Alloys. **Współczesne poglądy na utwardzanie dyspersyjne stopów metali.** (Polish.) Fryderyk Staub and Kazimierz Joszt. *Hutnik*, v. 22, no. 2, Feb. 1955, p. 54-62.

Changes of strength properties during aging; stastical thermodynamic, and precipitation hardening theories; investigations utilizing irradiation by neutrons and electron microscopy. Graphs, table, diagrams. 28 ref.

10719* **Effect of Plastic Deformation on the Kinetics of Martensite Formation in a High Chromium Steel.** S. C. Das Gupta and S. S. Pani. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 161-169; disc., p. 169-171.

Effect of varying degrees of deformation produced by compression and tension on the austenite-martensite transformation in a 15% Cr-0.7% C steel. Graphs. 23 ref.

10720* **Mechanism of a New Type of Ageing Phenomenon in Iron and Steel on Anodic Surcharging.** K. C. Som and G. P. Chatterjee. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 196-208; disc., p. 208-210.

Results and discussion of the various phenomena responsible for changes in hardness. Graphs, tables. 8 ref.

10721* **Diffusion in Solid Metals and Alloys.** G. P. Chatterjee. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 223-229; disc., p. 229-231.

Development of the concept of diffusion on the basis of potential and energy-density considerations. 10 ref.

10722* **Diffusion of Zinc in Alpha Brass Containing Tin.** K. C. Som, P. K. Sen, and G. P. Chatterjee. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 233-238; disc., p. 239-240.

Diffusion was evaluated as function of concentration and temperature. Diffusion coefficient of Zn is increased by the presence of Sn. Diagram, tables, graphs. 6 ref.

10723* **Electrolytic Migration of Carbon in Steel.** P. Dayal and L. S. Darken. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 241-250.

Accurate determination of the migration rate under the influence of direct current and the varying conditions of temperature and concentration, the charge borne by the carbon ion in austenite, and the transport number of carbon. Diagrams, table, micrographs. 9 ref.

10724 The Strain-Ageing of Pure Iron. B. Jones and R. A. Owen-Barnett. *Iron and Steel Institute, Journal*, v. 180, May 1955, p. 20-23 + 2 plates.

Aging of pure Fe after temper-rolling and tensile-straining. Tables, graphs, micrographs. 6 ref.

10725 Kinetics of the Martensite Transformation in a Hyper-Eutectoid Steel. J. Philibert and C. Crussard. *Iron and Steel Institute, Journal*, v. 180, May 1955, p. 39-48 + 1 plate; disc., p. 48-50.

Study of the nucleation of martensite and theoretical calculations to account for the high rate of nucleation. Graphs, micrographs. 12 ref.

10726* Intermediate Transformation of Supercooled Austenite. **O promezhutochnom prevashchenii pereokhlazhdennogo austenita.** (Russian.) L. I. Kogan and R. I. Entin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 1, Jan., p. 67-79.

Redistribution of C during transformation of austenite at intermediate temperatures. Micrographs, graphs, tables. 22 ref.

10727 High Temperature Properties of Iron-Rich Fe-Mo Alloys. S. F. Reiter and W. R. Hibbard, Jr. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, May 1955, p. 655-663.

Constant strain rate tensile tests were performed between room temperature and 1800 F. These data were analyzed to determine the effect of temperature and composition on the strain hardening coefficient and strain rate sensitivity. Tables, graphs, mircographs. 30 ref.

10728* Investigation of the Resistance to Growth of Magnesium Cast Iron. **Issledovanie rostoustoichivosti magnievogo chuguna.** (Russian.) A. D. Ushakov. *Liteinoe Proizvodstvo*, 1955, no. 4, Apr., p. 22-23.

Dilatometric study of vol. changes. Micrographs, graphs, table.

10729* Role of the Surface in the Graphitization of White Cast Iron. **Rol' poverkhnosti pri grafitizatsii belogo chuguna.** (Russian.) K. P. Bunin, Ia. V. Grechnyi, and N. M. Danil'chenko. *Liteinoe Proizvodstvo*, 1955, no. 5, May, p. 12-15.

Diffusion of C in the austenite from one surface to another; effect of vacuum, H or inert gases on rate of graphitization; effects of variation of heat treatment, and character of surface on rate of diffusion. Micrographs, diagrams. 26 ref.

10730* Effect of the Form of Perlite and of Ferrite Grain Size on the Properties of Steel Castings. **Vliianie formy perlita i razmera zeren ferrita na svoistva stal'nogo lit'ia.** (Russian.) M. M. Kantor and N. M. Serpik. *Liteinoe Proizvodstvo*, 1955, no. 5, May, p. 19-21.

Effect of various heat treatments on strength and structure. Micrographs, tables, graph. 2 ref.

10731 A High-Resolution Metallograph for Elevated Temperatures. J. E. Jenkins, D. R. Buchele, and R. A. Long. *Metal Progress*, v. 67, May 1955, p. 101-104.

Description of a microscope hot stage and a special objective of reflecting elements with a long working distance and a high numerical aperture to give max. resolving power. Changes in micro-structure are photographed with movie camera. Photograph, diagrams, micrographs.

10732 A Microscope Hot Stage. H. A. Saller, R. F. Dickerson, and R. J. Carlson. *Metal Progress*, v. 67, May 1955, p. 105-108.

Compact unit for studying structural changes in metals at temperatures up to 1800 F. Covers vacuum furnace, optical group, cold trap, and vacuum system. Diagram, photograph, micrographs.

10733 Factors Affecting Microcharacter of Metal Surfaces. (Digest of "Changes in Metallic Surfaces Produced by Chemical Processes and by Heating", by S. Z. Roginskii, I. I. Tret'yakov, and A. B. Shekhter; *Doklady Akademii Nauk SSSR*, v. 91, 1953, p. 1167-1169.) *Metal Progress*, v. 67, June 1955, p. 202, 204, 206.

Grain coarsening and the characteristic ledge structure upon prolonged heating of metal surfaces.

10734 Allotropic Transformations in Ternary Metal Systems. A. Prince. *Metal Treatment and Drop Forging*, v. 22, May 1955, p. 198-201.

Transformation equilibria involving the melt. Diagrams. 5 ref.

10735 The System Niobium-Silicon and the Effect of Carbon on the Structures of Certain Silicides. A. G. Knapton. *Nature*, v. 175, Apr. 23, 1955, p. 730.

Phase diagram of the Nb-Si system determined by melting-point determination, X-ray examination, and metallography.

10736 A Slip-Band Exudation Effect Observed in Pure Aluminium. P. J. E. Forsyth and C. A. S. Stubbington. *Nature*, v. 175, Apr. 30, 1955, p. 767-768.

Exudation is thought to be caused by cyclic stresses on a thin sandwich of material depleted of solute atoms. Micrographs. 2 ref.

10737* Preparation of Cast Iron for Microscopic Investigation. **Öntöttwas elókézítése mikroszkópi vizsgálatra.** (Hungarian.) Ferenc Boda. *Öntode*, v. 6, no. 4, Apr. 1955, p. 91-96.

Review of various processes; methods for decreasing the time for the specimen preparation; description of the author's rapid polishing process. Micrographs. 9 ref.

10738 Brillouin Zones of Some Intermetallic Compounds. P. J. Black. *Philosophical Magazine*, v. 46, 7th ser., no. 375, Apr. 1955, p. 401-409.

Data for nine Al-rich compounds of Fe were obtained by X-ray analysis. Tables. 23 ref.

10739 Recovery and Recrystallization in Metals Examined in Terms of the Restoration of the Transient Creep Properties. A. J. Kennedy. *Physical Society, Proceedings*, v. 68, no. 425B, May 1955, p. 257-276.

Investigation to determine the dependence of creep recovery on the temperature of the specimen during the recovery period. As recrystallization brings about a new mean grain size, the dependence of recovery on this factor was also examined. Graphs, table, diagrams. 34 ref.

10740 Growth of Monocrystals of Germanium From an Undercooled Melt. E. Billig. *Royal Society, Proceedings*, v. 229, ser. A, May 10, 1955, p. 346-363 + 5 plates.

Technique developed for the rapid growth of monocrystals of Ge and other materials with the diamond or zincblende structure. Tables, diagrams, micrographs, photographs. 14 ref.

10741* Effect of Various Alloying Elements on the Properties of Austentic Chromium-Nickel Steels Showing High Strength at Elevated Temperatures in the Temperature Range of From 600 to 700 C. **Einfluss verschiedener Legierungselemente auf die Eigenschaften warmfester austenitischer Chrom-Nickel-Stähle im Temperaturgebiet von 600 bis 700°.** (German.) Hanns Arnt Vogels. *Stahl und Eisen*, v. 75, no. 9, May 5, 1955, p. 559-570.

Effect of the pre-treatment on the hot shaping property, creep strength, tendency to embrittlement, and resistance to scaling. Tables, diagrams, graphs, micrographs. 17 ref.

10742 The Metallographic View. X. Effect of Heat Treatment on Medium Carbon Forgings. Howard E. Boyer. *Steel Processing*, v. 41, May 1955, p. 315, 323.

In plain carbon steels, one heat treating operation is frequently sufficient to provide a structure suitable for machining, forming, and final heat treatment; while in the case of alloy steels, irrespective of C content, at least two heating operations are more often required before suitable structures can be obtained. Micrographs.

10743 Solid Solutions and Grain Boundaries. B. L. Averbach, M. Cohen, F. Herbstein, J. Hilliard and R. Kaplow. *U. S. Atomic Energy Commission, NYO-7044*, Mar. 1955, 3 p. (UF767 U3ny)

Thermodynamic and X-ray techniques combined in a study of fundamental behavior of solid solutions. Solid solutions, adaptable to both of these methods, are being investigated in order that combined data may be useful in providing a more complete picture of at. configuration in solid solutions.

10744 Fundamentals of Cold Working and Recrystallization. B. L. Averbach, M. Cohen, S. Allen, M. F. Comerford, and C. Houska. *U. S. Atomic Energy Commission, NYO-7074*, Mar. 1955, 3 p. (UF767 U3ny)

A Fourier analysis of X-ray diffraction line shapes and metallographic methods are being used in an effort to investigate the detailed structure of plastically deformed metals.

10745* Theory of Diffusion of Atoms in Alloys. **Teoriia diffuzii atomov v splavakh.** (Russian.) M. A. Krivoglaz and A. A. Smirnov. *Uspekhi Fizicheskikh Nauk*, v. 60, no. 3, Mar. 1955, p. 391-442.

Diffusion effected by vacancy mechanism interstitially in crystal lattice; equations for determining diffusion coefficient in alloys of β-brass, Fe_3Al, etc. Diagrams, graphs. 29 ref.

10746 Effect of Welding on Transition Temperature of Nickel Steel Plate. T. N. Armstrong and W. L. Warner. *Welding Journal*, v. 34, May 1955, p. 209S-215S.

Welding does not appreciably lower the transition temperature of low-C, 3½% Ni steel plate, particularly if welds are stress relieved. Graphs, tables, photographs. 3 ref.

Metals—Metallography, Transformations, and Structures

10747* **Effect of Variations in Hardening and Tempering Temperatures.** Edwin Gregory. *Wild-Barfield Heat-Treatment Journal*, v. 5, Mar. 1955, p. 2-4 + 3 plates.

Precipitation of Cr, Mo, and V carbides in steel and resultant shock and impact properties. Tables.

10748* Manganese Alloys With Platinum, Iridium, Rhodium, and Ruthenium. **Die Legierungen des Mangans mit Platin, Iridium, Rhodium and Ruthenium.** (German.) Ernst Raub and Werner Mahler. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 282-290.

X-ray and metallographic investigations of binary systems. Constitution diagrams, tables, micrographs. 18 ref.

10749* Constitution of the Binary Systems: Gallium-Antimony, Gallium-Arsenic, and Aluminum-Arsenic. **Aufbau der Systeme Gallium-Antimon, Gallium-Arsen und Aluminium-Arsen.** (German.) Werner Köster and Berthold Thoma. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 291-293.

Analysis of constitution diagrams. Graphs, micrographs. 7 ref.

10750* Constitution of the Ternary System of the Metals of the Third and Fifth Groups of the Periodic System. **Aufbau ternärer Systeme von Metallen der dritten und fünften Gruppe des periodischen Systems.** (German.) Werner Köster and Berthold Thoma. *Zeitschrift für Metallkunde*, v. 46, no. 4, Apr. 1955, p. 293-297.

Constitutional diagrams of the systems: Al-Ga-Sb, Al-In-Sb, and Ga-In-Sb. Micrographic study of the systems. Diagrams, micrographs, graphs. 7 ref.

10751* Radiation Damage and Diffusion Processes in Precious Metals. **Bestrahlungsfehlordnung und Diffusionsvorgänge in Edelmetallen.** (German.) A. Seeger. *Zeitschrift für Naturforschung*, v. 10a, no. 3, Mar. 1955, p. 251-253.

Effect of bombardment with deutron particles, plastic deformation, and quenching on the lattice structures of Cu, Ag, and Au and their alloys. Tables. 12 ref.

10752* Investigation of the Martensitic Transformation in Steel. **Issledovanie martensitnogo prevrashcheniia v stali.** (Russian.) A. N. Alfimov and A. P. Guliaev. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 680-686.

Temperature and kinetics of transformation during cooling. Effect of grain size and no. of grains in test piece on start of transformation. Graphs, photographs, micrograph. 4 ref.

10753* Problem of Mosaic Texture in Semicrystalline Metals. **K voprosu o mozaichnosti kristallov v polikristallicheskikh metallakh.** (Russian.) V. I. Iveronova and A. A. Katsnel'son. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 4, Apr. 1955, p. 696-699.

Studies on Fe-Pr and Fe-Co alloys at various temperatures and durations of tempering. Graphs. 6 ref.

See also:

10248 (structure of Cu deposits)

METALS—POWDER

10754* **Powder Metallurgy.** *American Society for Naval Engineers, Journal*, v. 67, May 1955, p. 521-532.

Manufacturing, properties and testing of iron, ferrous-alloy, and non-ferrous metal powders; principles and control of compacting and sintering; manufacturing and properties of structural engineering components; powder metallurgy of high-melting-point materials. Table, photograph.

10755* Obtaining and Sintering of Molybdenum Silicide. **Otrzymywanie i spiekanie krzemku molibdenu.** (Polish.) W. Rutkowski. *Hutnik*, v. 22, no. 1, 1955; *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa*, v. 6, no. 1, 1955, p. 1-3.

Micro-structure and hot-gas corrosion of Mo silicide sintered at 1400 C. Comparisons with other alloys. Micrographs, photographs.

10756 The Sintering, Fabriction, and Properties of Thorium. M. D. Smith and R. W. K. Honeycombe. *Institute of Metals, Journal*, v. 83, May 1955, p. 421-426.

Systematic data on the sintering and working of relatively pure Th as the first steps in a program of work on the properties of Th-base alloys. Graphs, table. 15 ref.

10757 Metal Powder Components for Motor Vehicles. D. B. Martin. *Machinery (London)*, v. 86, May 6, 1955, p. 975-979.

Parts can be made to close dimensional tolerances by molding the powders in accurate dies and controlling the shapes of the compacts during heat-treatment. Diagrams, photographs.

10758 Powder Metallurgy for Atomic Engineers. (Digest of "The Role of Powder Metallurgy in the Design of Nuclear Power Reactors", by Henry H. Hausner and Milton C. Kells; presented before the Apr. 1955 meeting of the American Society of Mechanical Engineers.) *Metal Progress*, v. 67, June 1955, p. 167-168, 170.

General discussion of the way structural units, made by powder metallurgical methods, may be expected to differ from those made by conventional methods when exposed to conditions within a power reactor.

Books and Miscellaneous Publications

10759 Symposium on Testing Metal Powders and Metal Powder Products. ASTM Special Technical Publication No. 140. 87 p. 1953. American Society for Testing Materials, Philadelphia. (TN695 Am35t)

Applications and improved compositions, testing methods, and particle size distribution are discussed.

MINING ENGINEERING

10760* **Wind and Waves.** Richard J. Howe. *Drilling*, v. 16, May 1955, p. 69-71.

Application of design methods for offshore drilling units. Diagrams, graphs.

10761 Magnetic Surveys Over Serpentine Masses, Riley County, Kansas. Kenneth L. Cook. *Mining Engineering*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 202, May 1955, p. 481-488.

Instruments; field techniques; results. Map, diagrams, graphs. 19 ref.

10762* **Single and Double Tube Core Barrels for Diamond Drilling Operations.** *Mining Journal*, v. 244, Apr. 15, 1955, p. 413-414.

Includes diagram.

10763* **Geophysical Methods of Oil Prospecting. A Review. IV. Seismic Methods.** D. Taylor Smith. *Petroleum*, v. 18, June 1955, p. 211-217.

Effect of explosions; elastic properties of rocks; effect of boundary; methods of prospecting; marine prospecting; advantages and limitations of seismic method. Photographs, graphs, diagrams, table. (To be continued.)

10764* New Devices for Measuring the Load on a Mine Shoring Support. **Novye pribory dlia izmereniia nagruzki na krep'.** (Russian.) E. S. Prigozhin and P. E. Levkovich. *Ugol'*, 1955, no. 4, Apr., p. 28-29.

Design of dynamometers with automatic recording. Drawings, photograph.

10765* **Exploration Success Patterns with the Airborne Magnetometer.** F. W. Hinrichs. *Western Miner and Oil Review*, v. 28, May 1955, p. 36-39.

Includes graphs, diagrams.

10766 How to Select and Use Rotary Drilling Fluids. II. Earl E. Huebotter, T. H. Dunn, and Frank S. Bell. *World Oil*, v. 140, June 1955, p. 207-208, 212, 214.

Factors affecting maintenance. Diagrams, graph, table.

10767* **The Turbine Drilling System and Its Application in the U.S.S.R.** George Rosu. *World Petroleum*, v. 26, Apr. 1955, p. 38-41.

Discusses drilling fluids and pumps required, together with an examination of operating results. Diagrams. 8 ref.

NONDESTRUCTIVE TESTING

10768 Improving Casting Quality Through Non-Destructive Testing. Francis H. Hohn. *American Foundryman*, v. 27, May 1955, p. 96-100.

Equipment used to obtain quantitative information about steel casting quality which is then used to evaluate factors that might be responsible for deviations from the desired soundness level. Photographs, X-rays, radiograph, graphs, diagrams.

10769* Gamma-Radiography in Oil Storage Installations. IV. C. C. Bates. *Atomics (British)*, v. 6, May 1955, p. 144-147, 150.

Health and safety precautions applicable in this type of work. New method of nondestructive testing enables a very high standard of weld inspection to be achieved. Photographs.

10770 Industrial Applications of X-Ray Techniques. T. H. Rogers. *Institute of Radio Engineers, Transactions on Industrial Electronics*, PGIE-2, Mar. 1955, p. 20-26. (TK1 In6.6ie)

Used for industrial and flash radiography, fluoroscopy, and thickness gauging. Diagrams, circuit diagrams, photographs. 6 ref.

10771 Magnetic Measurement of the Hardness of Metals. D. Hadfield. *Metal Treatment and Drop Forging*, v. 22, May 1955, p. 219-224.

Practical application of the method to the nondestructive testing of low-alloy-content steel components. Photograph, diagrams, tables, graphs. (To be continued.)

10772* Methods of Bond Testing. W. J. McGonnagle, J. H. Monaweck, and W. G. Marburger. *Nondestructive Testing*, v. 13, Mar.-Apr. 1955, p. 17-22.

The ultrasonic transmission method was most sensitive. The electronic potential and thermographic methods were less sensitive. Diagrams, graphs, tables, photographs, micrographs. 3 ref.

10773* New Application of Ultra-Sound in the Testing of Materials. **Nouvelles applications des ultra-sons a l'essai des matériaux.** (French.) J. Brigg. *Revue universelle des mines*, v. 11, ser. 9, Apr. 1955, p. 137-151.

Review of existing methods of nondestructive testing. Fields of application of ultrasonic methods. Photographs, tables, diagrams. 17 ref.

10774* Use of Radioactive Isotopes to Control the Homogeneity of Solid Bodies and Determine Linear Dimensions. **Primenenie radioaktivnykh izotopov dlia kontrolia odnorodnosti tverdykh tel i opredeleniia lineinykh razmerov.** (Russian.) M. B. Neiman. *Stanki i Instrument*, v. 26, no. 4, Apr. 1955, p. 1-5.

Application of xeroradiography; determination of corrosion, wall, and coating thicknesses. Diagrams, graphs. 21 ref.

10775 Ultrasonics Makes Itself Heard. Peter K. Bioch. *Steel*, v. 136, May 16, 1955, p. 118-119.

Used as a thickness tester and to distinguish nodular from gray iron. Photographs.

10776* New Possibilities in the Radiography of Steel. **Neue Möglichkeiten der Röntgendurchleuchtung von Stahl.** (German.) G. Lang. *VDI Zeitschrift*, v. 97, nos. 11-12, Apr. 15, 1955, p. 347-350.

Steel of considerable thickness can be inspected directly by using an image-amplifying tube instead of a fluorescent screen. Graphs, diagrams, photographs, table. 7 ref.

10777 Oscillographic Instruments in Spot Welding Quality Control and Maintenance. Glenn Woodmancy. *Welding Journal*, v. 34, May 1955, p. 425-432.

Cathode-ray oscilloscope and direct writing magnetic oscillograph are described as being useful and necessary tools for welder maintenance under a high requirement quality control program. Photographs, graphs. 8 ref.

10778 Radiographing 620 Miles of Welded Pipeline. *Welding Journal*, v. 34, May 1955, p. 459-460.

Equipment, methods, and problems in construction of 8-in. line in Alaska. Photographs.

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

10779* Atomic Energy. E. C. Pigott. *American Society for Naval Engineers, Journal*, v. 67, May 1955, p. 375-398.

Principles; military and civilian utilization. Diagrams, tables, graphs. 52 ref.

10780* Gas Discharge Mechanism of Halogen-Quenched Counters. D. van Zoonen. *Applied Scientific Research*, v. 4, sec. B, no. 4, 1955, p. 237-248.

Includes diagrams, table, graphs. 14 ref.

10781* The Handling of Radioactive Materials. II. K. W. Bagnall and W. T. Spragg. *Atomics (British)*, v. 6, May 1955, p. 125-129, 133.

Concerned with α β γ equipment and its proper use. Diagrams. 17 ref.

10782 High-Frequency Plasma-Electron Oscillations. K. G. Emeleus and R. A. Bailey. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 127-128.

Methods considered for increasing concentration of plasma electrons and plasma electron frequency in low pressure gaseous discharges traversed by electron beams. Two discharges are described which generate oscillations with a frequency of approximately 10^4 Mc. per sec. Diagram. 4 ref.

10783 The Relative Abundances of Neodymium and Samarium Isotopes in the Thermal Neutron Fission of U^{235} and U^{233}. E. A. Melaika, M. J. Parker, J. A. Petruska, and R. H. Tomlinson. *Canadian Journal of Chemistry*, v. 33, May 1955, p. 830-837.

Yields measured by wave spectrometry. Cross sections and half-lives determined. Tables. 13 ref.

10784 Nuclear Energy. I. Atomic Power Reactors and Their Fuels. G. C. Laudence. *Chemistry in Canada*, v. 7, May 1955, p. 33-37.

Basic principles of converting nuclear to electrical energy; design features, operation, construction materials, and fuel requirements for power reactors. Table, diagrams. (To be continued.)

10785* On the Spectrum of an Unsymmetric Operator Arising in the Transport Theory of Neutrons. Joseph Lehner and G. Milton Wing. *Communications on Pure and Applied Mathematics*, v. 8, May 1955, p. 217-234.

8 ref.

10786* Remarks on the State of Excitation With a Short Half-Life and Production of Mesons. **Remarques sur les états excités à vie moyenne brève et la production des mésons.** (French.) Bernard d'Espagnat and Jacques Prentki, *Comptes rendus*, v. 240, no. 14, Apr. 4, 1955, p. 1514-1516.

Application of the Peaslee's theory to the production of mesons from a nucleon. 5 ref.

10787* Hyperons as the Excited States of Nucleons. A Possible Mechanism of the Multiple Generation of Particles. **Giperony kak vozbuzhdennye sostoianiia nuklonov. Vozmozhnyi mekhanizm mnozhestvennogo rozhdeniia chastits.** (Russian.) M. A. Markov. *Doklady Akademii Nauk SSSR*, v. 101, no. 3, Mar. 21, 1955, p. 449-452.

Mathematical treatment. 1 ref.

10788 Gamma Radiation Effects on Liquid Dielectrics. T. D. Callinan. *Electrical Engineering*, v. 74, June 1955, p. 510-515.

Radiation transforms dielectric liquids by converting them into solids or by decomposing them into acids and gases. Diagrams, graphs, tables, photograph.

10789* Chemical Aspects of the Atomic Industry. E. Glueckauf. *Endeavour*, v. 14, Apr. 1955, p. 83-89.

Production of plutonium; chemical separation during recycling; disposal of fission products; utilization of fission products in the future. Tables, graphs, flow diagrams, photographs. 5 ref.

10790* Possibilities of Operating Atomic Electric Power at Competitive Rates. W. B. Lewis. *Engineering Journal*, v. 38, May 1955, p. 621-626.

Nuclear Physics, Nucleonics, and Radiation

With resonable assurance of low fuel costs for thermal reactors, it is expected that the reactor costs can be brought to a level at which nuclear power generation will be economically competitive. Graphs, tables.

10791 The Energy Spectra of the Light Atom Nuclei. **Die Energieschemata der leichten Atomkerne. II.** The Energy Spectra of the Nuclei ^{20}F to ^{36}Cl. **Die Energieschemata der Kerne ^{20}F bis ^{36}Cl.** (German.) U. Cappeller. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 125-187. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Energy spectra of nine elements and their isotopes. Tables, diagrams. 8 ref.

10792 Impulse Amplifiers and Impulse Spectrographs. **Impulsverstärker und Impulsspektrographen.** (German.) Ernst Baldinger and Willy Haeberli. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 248-289. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Discussion of problems on the use of the above, especially as used in measurements with the aid of the ionization chamber. Diagrams, graphs. 48 ref.

10793 Scintillation Counters. **Szintillationszähler.** (German.) A. Krebs. Paper from ERGEBNISSE DER EXAKTEN NATURWISSENSCHAFTEN. v. XXVII. p. 361-409. 1953. Springer-Verlag, Berlin. (QC21 Er38)

Historical review; survey of the literature on different scintillation counters; uses of phosphors in scintillation research. Use of scintillation counters in nuclear physics, study of cosmic radiation, radiobiology, and medicine. Diagrams, graphs, tables, spectrograms. 236 ref.

10794 Application of Mixed Bed Ion Exchange to Water Purification in Nuclear Reactors. Michael Sivetz and C. H. Scheibelhut. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1020-1022.

The many advantages, on corrosion, decomposition, radioactivity, and neutron economy, are cited. Table, graphs, diagram. 12 ref.

10795* Industrial Applications of Radioactivity. (English.) Torbjörn Westermark, Gunnar Aniansson, Lars-Gustaf Erwall and Knut Ljunggren. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning*, v. 26, no. 3, 1955, p. 81-85.

Uses in flotation chemistry, thickness measurements with γ-rays, wear studies, and other applications. Photograph. 13 ref.

10796 Nuclear Thermodynamics of the Heaviest Elements. Richard A. Glass, Stanley G. Thompson, and Glenn T. Seaborg. *Journal of Inorganic and Nuclear Chemistry*, v. 1, Mar. 1955, p. 3-44.

Literature covered through Sept. 1954, on closed decay-energy cycles predicted up to at. no. 103. Tables, graphs, diagrams. 121 ref.

10797* Factors Influencing the Behavior of Polymers Exposed to High-Energy Radiation. Leo A. Wall. *Journal of Polymer Science*, v. 17, May 1955, p. 141-142.

Nine polymers are examined. Table. 5 ref.

10798* Handling of Radioactive Materials at the Atomic Energy Research Establishment. K. Mumby. *Mechanical Handling*, v. 42, May 1955, p. 252-259.

Handling and disposal of fission products at Harwell, England. Photographs, diagrams.

10799 ORNL's Design for a Power Reactor Package. R. S. Livningston and A. L. Boch. *Nucleonics*, v. 13, May 1955, p. 24-27, 46.

Description covers the core, pressure vessel, cooling and control systems, shielding, costs and calculations for criticality and control. Diagrams, graph.

10800 Using Neutrons for Remote Liquid-Level Gaging. S. Barnartt and K. H. Sun. *Nucleonics*, v. 13, May 1955, p. 47-49.

First tests of liquid-level measurement, using a fast-neutron source and a new slow-neutron detector, show that method works well for hydrogenous and other light liquids. Diagrams, graphs. 12 ref.

10801 A Contribution to the Theory of Nuclei With a Diffuse Surface. Z. Janković. *Philosophical Magazine*, v. 46, 7th ser., no. 375, Apr. 1955, p. 377-380.

Includes graphs. 4 ref.

10802 Further Evidence for the Electron-Decay of K-Mesons. R. H. W. Johnston and C. O'Ceallaigh. *Philosophical Magazine*, v. 46, 7th ser., no. 375, Apr. 1955, p. 393-400.

Includes graphs, tables. 10 ref.

10803 Radioactive Tantalum. F. D. S. Butement and A. J. Poë. *Philosophical Magazine*, v. 46, th ser., no. 376, May 1955, p. 482-484.

Preparation and properties. Graphs. 2 ref.

10804 Range Straggling in Nuclear Track Emulsion. Walter H. Barkas, Frances M. Smith, and Wallace Birnbaum. *Physical Review*, v. 98, ser. 2, May 1, 1955, p. 605-610.

Contributions to the range variance in nuclear track emulsions were studied and the magnitude of the various effects calculated. Tables, graph. 14 ref.

10805 Energy Levels of Se^{76} Appearing in Disintegration of As^{76}. J. D. Kurbatov, B. B. Murray, and M. Sakai. *Physical Review*, v. 98, ser. 2, May 1, 1955, p. 674-677.

The radiations from As^{76} were studied by means of a thick lens magnetic spectrometer and a scintillation coincidence spectrometer. Diagrams, graphs, tables. 8 ref.

10806 Photodisintegration of the Deuteron by 95-Mev Bremsstrahlung. Lew Allen, Jr. *Physical Review*, v. 98, ser. 2, May 1, 1955, p. 705-710.

Photoprotons produced by irradiating deuterium gas with betatron X-rays were detected with stacks of unsupported Ilford emulsions. Diagram, table, graphs. 26 ref.

10807* The Electromagnetic Separation of Stable Isotopes. R. H. V. M. Dawton and Mervyn L. Smith. *Quarterly Reviews*, v. 9, no. 1, 1955, p. 1-22 + 2 plates.

Design and use of instruments; also applicable to chemical separation. Tables, graphs, diagrams, photographs. 33 ref.

10808* X-Ray Dosimetry by Radiolysis of Some Organic Solutions. I. Dithizone and Methyl Yellow Solutions. George L. Clark and Paul E. Bierstedt, Jr. *Radiation Research*, v. 2, May 1955, p. 199-218.

Includes graphs, tables, diagrams. 21 ref.

10809* Some Aspects of the Utilization of Radio Elements. **Quelques aspects de l'utilisation des radioéléments. I.** (French.) Roland Muxart. *Revue générale des sciences pures et appliquées*, v. 62, nos. 3-4, Mar.-Apr. 1955, p. 82-101.

Methods of using radioactive tracers. (To be continued.)

10810 Radioactive Fallout in the United States. Merril Eisenbud and John H. Harley. *Science*, v. 121, May 13, 1955, p. 677-680.

Technique of collection; station sites; fallout activities. Table, graph, map. 8 ref.

10811 Production of Radioactive Organic Compounds With Recoil Tritons. Richard Wolfgang, F. S. Rowland, and C. Nigel Turton. *Science*, v. 121, May 20, 1955, p. 715-717.

Tritium labeled compounds are suggested; glucose plus Li_2CO_3 were tried. Table. 9 ref.

10812* Isotopic Effect in Atomic Spectra. **Izotopicheskii effekt v atomnykh spektrakh.** (Russian.) A. R. Striganov and Iu. P. Dontsov. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 3, Mar. 1955, p. 315-390.

Average and heavy elements. Survey of theories; comparison of experimental and theoretical data. Equations, graphs, tables, diagrams. 214 ref.

10813* Table of Nuclear Moments. **Tablitsa iadernykh momentov.** (Russian.) E. F. Kiul'ts, V. V. Kunts, and V. G. Hartman. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 4, Apr. 1955, p. 537-593.

Includes tables. 540 ref.

10814* Separation of Nuclear "Isomers". **Razdelenie iadernykh izomerov.** (Russian.) A. S. Krivokhatskii. *Uspekhi Khimii*, v. 24, no. 3, 1955, p. 302-312.

Isomeric nuclei are defined as nuclei with the same number of protons and neutrons which, however, differ in their energy state. Physical and chemical methods of isolating the "isomers"; determination of higher and lower isomers of many elements, half-life periods, and radiation type. Tables. 88 ref.

10815* Theory on the Scattering of Fast Charged Particles. **Theorie der Streuung schneller geladener Teilchen. III.** Multiple Scattering of Tracks With Consideration of Statistical Coupling. **Die Vielfachstreuung von Bahnspuren unter Berücksichtigung der statistischen Kopplung.** (German.) G. Molière. *Zeitschrift für Naturforschung*, v. 10a, no. 3, Mar. 1955, p. 177-211.

Method of determination by dividing tracks into small sections and measuring specific characteristics of each section. Graphs, tables. 22 ref.

10816* Some Characteristics of the Electrical Discharge Recorder for Recording α-Particles. **O nekotorykh svoistvakh iskrovogo schetchika dlia registratsii α-chastits.** (Russian.) E. Andreeshchev and B. M. Isaev. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 3, Mar. 1955, p. 335-342.

Self-stabilizing properties; the device variation in calculation curves; humidity; formation of heavy negative ions. Graphs, diagrams. 9 ref.

10817* Absence of Stable Technetium and Promethium Isotopes, and Other Anomalies in the Prevalence of β-Stable Nuclei. **Ob otsutstvii stabil'nykh izotopov Tc and Pm i drugikh anomaliiakh v rasprostranennosti β-stabil'nykh iader.** (Russian.) A. V. Savich. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 3, Mar. 1955, p. 361-368 + 2 plates.

Patterns in periodic arrangement of atomic nuclei. Anomalies and regularities of nuclear shells. Tables. 13 ref.

10818* Spontaneous Fission of Thorium. **O spontannom delenii toriia.** (Russian.) A. V. Podgurskaia, V. I. Kalashnikova, G. A. Stoliarov, E. D. Vorob'ev, and G. N. Flerov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 4, Apr. 1955, p. 503-505.

Includes tables. 7 ref.

Books and Miscellaneous Publications

10819* **Bibliography of Syntheses With Carbon Isotopes.** Judd C. Nevenzel, Richard F. Riley, David R. Howton, and Gunther Steinberg, compilers. U. S. Atomic Energy Commission, UCLA-316. 175 p. 1954. Office of Technical Services, Department of Commerce, Washington, D. C. (ZQD466.5.Cl Cl2.5b)

References to the preparation of carbon-isotope-labeled compounds have been collected from the literature through 1952 and have been indexed according to formula and to author. 748 ref.

See also:

9878 (effects of radiation on plants)
10107 (pile irradiation of iodate ions)
10302 (future atomic industry needs)
10448 (uranium carbide system)
10751 (radiation damage in precious metals)
10887 (scintillation counters)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

10820 Maintaining the Automated Plant. N. K. Conrad. *American Society of Mechanical Engineers, Paper No.* 55—SA-43, 1955, 6 p. (TJ1 Am35p)

Outlines the methods used for achieving efficient maintenance services and the latest developments in cost control of equipment.

10821 The New World of Research. *Business Week*, 1955, no. 1343, May 28, p. 104 + 18 pages.

Special report on values of research to business and to the world. Photographs, graph, chart.

10822 Starting Research Projects. The Amber Light on Research. Stopping Research Projects. Paul C. Wilbur, Maurice Nelles, and George Roberts, Jr. *Chemical and Engineering News*, v. 33, May 16, 1955, p. 2134-2136.

Economic considerations of present-day research.

10823 Future Aims of Large Scale Research. Alvin M. Weinberg. *Chemical and Engineering News*, v. 33, May 23, 1955, p. 2188-2191.

Programs for future utilization of large nuclear research centers. Photographs, diagram.

10824 Stimulating Creativity in Research. Emil Ott. *Chemical and Engineering News*, v. 33, May 30, 1955, p. 2318-2321.

Creativity usually occurs in seven steps: problem delineation, preparation, frustration, incubation, illumination, verification, and communication.

10825 Operations Research: Scientific Approach to Management. Martin Goland and Ernest Koenigsberg. *Chemical Week*, v. 76, May 21, 1955, p. 42 + 12 pages.

Advantages, details, and future of this aid to management. Tables.

10826* Quality Control—Use of Statistical Methods in Steel Industry. A. V. Sukhatme. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 123-133; disc., p. 133-136.

Some examples of the application of quality control which show that substantial results were achieved. Diagrams, graphs.

10827 Partially Balanced Incomplete Block Designs With Two Associate Classes and Two Treatments Per Block. Willard H. Clatworthy. *Journal of Research, National Bureau of Standards*, v. 54, Apr. 1955, p. 177-190.

Cites application to comparison of meter bars, examined two at a time. Tables. 11 ref.

10828 Interrelationship of Acute Alkalosis and Potassium Metabolism. Charles R. Kleemas, Milton E. Rubini, Ezra Lamdin, Robert E. Kiley, and Ivan L. Bennett, Jr. *Metabolism: Clinical and Experimental*, v. 4, May 1955, p. 238-249.

Includes graphs, tables. 24 ref.

10829 Aerosol Safety Factors. A. Haldane Gee and Georgy W. Fiero. *Soap and Chemical Specialties*, v. 31, May 1955, p. 172-175.

Consumer considerations in design and formulation. 4 ref.

10830* Further Raising Work Safety in the Coal Industry. **Za dal'neishee povyshenie bezopasnosti truda v ugol'noi promyshlennosti.** (Russian.) I. V. Bobrov. *Ugol'*, 1955, no. 4, Apr., p. 1-7.

Removal of noxious gases; measures against dust explosions; hoisting machines; safety devices. Circuit diagrams, photographs, diagrams, graph.

Books and Miscellaneous Publications

10831 Operations Research Challenge to Modern Management. Gerhard R. Andlinger, Jack L. Barber, Jules L. Bigio, John J. Caminer, Bernt J. Fossum, Jr., William M. Gordon, Peter A. Kessner, Charles N. Neunhoffer, and Jean M. Querenet. 3rd Ed. 125 p. 1954. Harvard University, Graduate School of Business Administration, Cambridge, Mass. (T58 Op1.8)

Objectives, advantages, and procedures of operations research. Applications to business management.

10832 An Introduction to Stochastic Processes With Special Reference to Methods and Applications. M. S. Bartlett. 312 p. 1955. Cambridge University Press, London. (QA273 B28i)

Primary aim is to acquaint the applied mathematician and statistician with the new mathematical and statistical techniques available for studying stochastic processes.

10833 Information Processing Equipment. M. P. Doss, editor. 270 p. 1955. Reinhold Publishing Corp., New York. (TR925 D74i)

Operations Research and Management Engineering

All the equipment used in the preparation, reproduction, and utilization of written information are described and illustrated. The latest developments in such informational media as electric and automatic typewriters, calculating machines, collating machines, industrial photography, microcopying, punched cards, and machines for handling numerical data are discussed by authorities in the field.

10834 Out of My Later Years. Albert Einstein. 282 p. 1950. Philosophical Library, New York. (QC6 Ei68o)

Collected essays on a variety of subjects, covering the period from 1934 to 1950.

10835 Nonprofit Research and Patent Management Organization. Archie M. Palmer. 150 p. 1955. National Academy of Sciences—National Research Council, Washington, D. C. (T215 P18n)

Analysis of the organic structure of 104 research institutes and patent management agencies, their institutional affiliations, pertinent excerpts from their articles of incorporation and by-laws, their objectives, operating procedures, research and patent policies, and experiences with research and patent management problems.

See also:

10974 (quality control for textiles)

ORE AND MATERIALS BENEFICIATION

10836* Possibility and Limits of Stepwise Flotation of Soft Coal for Reducing the Content of Fine-Concretionarily Interspersed Pyrite. **Möglichkeit und Grenzen der stufenweisen Steinkohle-Flotation zur Senkung des Gehaltes an feinkonkretionär eingesprengtem Schwefelkies.** (German.) Hans Jürgen Ertle. *Erdöl und Kohle*, v. 8, no. 4, Apr. 1955, p. 243-247.

Experiments on the reduction of the combined-S with the aid of lime. Tables, micrographs. 12 ref.

10837* Studies on Chlorination of Ilmenite. R. Manocha. *Indian Institute of Metals, Transactions*, v. 7, 1953, p. 95-104.

The selective chlorination of the Fe of ilmenite with the object of reducing the Fe content of the mineral thus beneficiating it in titania. Tables. 14 ref.

10838* The Grinding Process Shown by the Principle of Similarity. **Formalingen i belysning af modellaeren.** (Danish.) A. H. M. Andreasen. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning*, v. 26, no. 3, 1955, p. 86-93.

Theory of similarity applied to the different mill types furnishes a comprehensive insight into their working conditions and efficiency. Graphs, diagram, table. 5 ref.

10839* Results and Prospects of the Investigation of the Interaction of Reagents With Minerals in Flotation. **Rezul'taty i perspektivy issledovaniia vzaimodeistviia reagentov s mineralami vo flotatsii.** (Russian.) I. N. Plaksin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 1, Jan., p. 109-134.

Determination of xanthogenates by radioactive isotopes; absorption data; time of adherence of particles to air bubble. Table, graphs. 33 ref.

10840 Sintering Practice at Rouge Plant Utilizes Low Grade Hematite. Robert L. Cleveland. *Journal of Metals*, v. 7, May 1955, p. 616-618.

Operation at the Ford Motor Company plant for production, conveyance, storage, and testing of sinter for blast furnaces. Photographs, table, diagram.

10841* Thermodynamic Investigation of the Reactions Taking Place During the Roasting of Pyrite and Sphalerite. **A szfalerit és pirit oxidáló pörkölésénél lejátszódó reakciók termodinamikai vizsgálata.** (Hungarian.) Zoltán Horváth. *Kohászati Lapok*, v. 10, no. 4, Apr. 1955, p. 163-176.

Investigation of reaction kinetics; variation of the thermodynamic normal potential of the process with the temperature; equilibrium composition of the gas and its changes. Graphs. 6 ref.

10842* Grinding and Classification at Humboldt. L. J. Erck. *Mining Congress Journal*, v. 41, May 1955, p. 32-35.

Operating mill exceeds capacity estimated on basis of pilot plant experience. Photographs, diagram.

10843 Handling Difficult Flotation Froths. W. H. Reck. *Mining Engineering*, v. 7, May 1955, p. 471-472.

Description of pumps and other elevating equipment. Diagrams.

10844 Quantitative Use of X-Ray Diffraction for Analysis of Iron Oxides in Gogebic Taconite of Wisconsin. R. S. Shoemaker and D. L. Harris. *Mining Engineering*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 202, May 1955, p. 476-480.

X-ray diffraction procedures; applications to beneficiation studies. Diagram, tables, graphs. 13 ref.

10845* Treatment of Cuban Nickel-Cobalt Ores. *Mining Journal*, v. 244, May 13, 1955, p. 530-532.

High economy recovery; treatment of nickeliferous ores; metallurgical investigations.

10846* Preparation of Coal. Necessity—Role—Methods. Importance in the Coal Industry. **La préparation des charbons. (Nécessité—role—méthodes. Importance dans l'industrie houillère).** (French.) Pozzetto. *Revue de l'Industrie Minérale*, v. 36, no. 622, Apr. 1955, p. 467-489.

Includes photographs, diagrams.

10847* Characteristic Magnitudes for Evaluating the Properties of Suspensions in Ore-Beneficiation Plants. **Über die Kenngrössen zur Beurteilung der Eigenschaften von Schwertrüben in Erzaufbereitungsanlagen.** (German.) Friedrich Wilhelm Mayer. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 8, no. 4, Apr. 1955, p. 138-146.

Relations between solid content and density of slurries. Tables, graphs, diagrams. 8 ref.

10848* The Stripa Specific Gravity Process. **Das Stripa-Schwimm-Sink-Verfahren.** (German.) Jonas Svensson. *Zeitschrift fur Erzbergbau und Metallhüttenwesen*, v. 8, no. 4, Apr. 1955, p. 147-152.

Sink-float separation method utilizes a heavy-medium liquid flowing in a shaking trough.

10849* A Contribution to the Treatment of Cassiterite. **Ein Beitrag zur Zinnsteinaufbereitung.** (German.) Werner Gründer. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 8, no. 4, Apr. 1955, p. 152-157.

Review of methods of concentrating Sn ores. Tables. 11 ref.

10850* Principles and Possible Applications of the Elutriation Process in Ore Beneficiation. **Grundzüge und Anwendungsmöglichkeiten der Rheax-Schlämmverfahren in der Erzaufbereitung.** (German.) Franz Kirnbauer. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 8, no. 4, Apr. 1955, p. 157-161.

Comparison of horizontal and verticle washing methods. Diagrams, photographs, tables. 13 ref.

10851* The Classifying Effect in the Rosin-Rammler-Bennett Net. **Der Klassiereffekt, dargestellt im Rosin-Rammler-Bennett-Netz.** (German.) Helmut Trawinski. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 8, no. 4, Apr. 1955, p. 162-170.

Description of ore grinding and classifying method. Graphs. 14 ref.

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Studies of fractures of porous materials caused by growth of crystals previously absorbed in the form of solutions. Photographs.

10853 Electrostatic Strong-Focusing Lens. M. Loren Bullock. *American Journal of Physics*, v. 23, May 1955, p. 264-268.

Constant gradient fields; optical properties; two- and four-lens systems. Diagrams, photograph. 6 ref.

10854* **Recent Developments in Boiling Research.** W. H. Jens and G. Leppert. *American Society for Naval Engineers, Journal*, v. 67, May 1955, p. 437-456.
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10855* **On the Theory of Photoelectric Compensators and Their Accuracy.** Andreas Kelen. *Applied Scientific Research*, v. 4, sec. B, no. 4, 1955, p. 278-284.
Operating principles of photoelectric compensators; formulas characterizing behavior of measuring systems with partial compensation; influence of spontaneous thermal fluctuations on measuring accuracy. Diagrams. 5 ref.

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A non-dispersive, optic-electrical filter instrument, combining high spectral resolving power ($\sim$ 0.1 Å) with large luminosity at wave lengths which are of interest in spectrochemistry. Diagram, graphs. 5 ref.

10857 The Solution of Transient Heat Flow and Heat Transfer Problems by Relaxation. G. Liebmann. *British Journal of Applied Physics*, v. 6, Apr. 1955, p. 129-135.
Includes graphs, table, diagrams. 11 ref.

10858 Some Properties of Magnetic Fluids. J. E. Coolidge, Jr. and R. W. Halberg. *Communication and Electronics*, 1955, no. 18, May, p. 149-152.
Measurements on fluids for use in magnetic clutches. Photograph, diagrams, graphs, table. 5 ref.

10859* Measurement of Potentials in Unipolar Ionized Electric Field (Mobility of Ions in the Air). **La mesure des potentiels dans les champs électriques ionisés unipolaires (mobilités des ions dans l'air).** (French.) Robert Cochet and René Reffay. *Comptes rendus*, v. 240, no. 14, Apr. 4, 1955, p. 1516-1518.
3 ref.

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Fundamental principles of the magnetic amplifier; examples of new uses recently developed for it in various fields. Diagrams. 13 ref.

10864 Silicon Solar Energy Converts. M. B. Prince. *Journal of Applied Physics*, v. 26, May 1955, p. 534-540.
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A set of formulas defining diffusion lengths in heterogeneous assemblies which even in the homogeneous limit, lead to anisotropic diffusion lengths for systems such as rod or slab assemblies which are microscopically anisotropic.

10866* Shock Waves in Dense Medium. **Les ondes de choc en milieu dense. I.** Some Theoretical Considerations. **Rappel de quelques considérations théoriques.** (French.) Jean Kieffer, Jean Dapoigny, and Boris Vodar. *Journal des recherches du centre national de la recherche scientifique*, 1955, no. 30, Mar., p. 137-146.
Theory of shock waves and its application to gases and liquids. Tables, diagrams. 13 ref.

10867* Physiological-Optical Conditions and the Problems of Technical Optics Raised by the Use of Image Changers for X-Ray Picture Intensifiers. **Die physiologisch-optischen Verhältnisse und die Aufgaben der technischen Optik beim Einsatz von Bildwandlern zur Röntgenbildverstärkung.** (German.) H. Jensen. *Optik*, v. 12, no. 3, 1955, p. 105-116.
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Semigraphic method of dealing with converging beams of light and other factors in optical systems. Tables, graphs. 3 ref.

10869* **Spectroscopy in the Oil Industry. I.** W. C. Price. *Petroleum*, v. 18, May 1955, p. 161-164.
Principles and practice of infra-red spectroscopy. Photographs. (To be continued.)

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Approximate solution of anharmonic vibrational motion of atoms in a crystal. 7 ref.

10871 Interaction of Dislocations and F-Centres in Sodium Chloride Single Crystals. S. Amelinckx, W. Van der Vorst, R. Gevers, and W. Dekeyser. *Philosophical Magazine*, v. 46, 7th ser., no. 375, Apr. 1955, p. 450-451 + 1 plate.
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Two analytical solutions to problems for which the nonlinearity is present. Diagrams, tables, graphs. 7 ref.

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It is seen from measurements on ferrites that the heat changes that occur are explicable in terms of the same basic causes, although the relative importance of the various contributory processes may be very different. Diagrams. 9 ref.

10874* Electromagnetic Waves in Magnetized Ferrite When Conducting Surfaces Are Present. **Elektromagnitnye volny v namagnichennom ferrite pri nalichii provodiashchikh ploskostei.** (Russian.) A. L. Mikaelian and A. A. Pistol'kors. *Radiotekhnika*, v. 10, no. 3, Mar. 1955, p. 14-24.
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10875* Reports Presented at the Meeting on Infra-Red Study. **Communications présentées aux journées d'études sur l'infrarouge.** (French.) *Revue d'optique*, v. 34, no. 3, Mar. 1955, p. 150-180.
Five reports covering refractometry, optical systems with large aperatures, and military applications.

10876* Obtaining High Temperatures (up to 55,000 C) Under Laboratory Conditions. **Poluchenie vysokikh temperatur (do 55,000°) v laboratornykh usloviiakh.** (Russian.) O. Praining. *Uspekhi Fizicheskikh Nauk*, v. 55, no. 4, Apr. 1955, p. 595-608.
Use of superpower arc, chemical reactions, etc. Diagrams, photographs. 20 ref.

10877* The Behavior of Vacuum Photocells on Irradiation With Light Impulses. **Über das Verhalten von Vakuum-Photozellen bei Bestrahlung mit Lichtimpulsen.** (German.) Werner

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Kluge and Suso Weber. *Zeitschrift für angewandte Physik*, v. 7, no. 3, Mar. 1955, p. 126-131.

Demonstrates the utility of photocells with Ag-Cs_2O-Cs cathode as photometer for extreme light intensities. Diagram, graphs. 11 ref.

10878* Rotating Processes in Ultrasound Interference Fields. **Rotationsvorgänge in Ultraschallinterferenzfeldern.** (German.) W. Schmitz and R. Gross. *Zeitschrift für angewandte Physik*, v. 7, no. 3, Mar. 1955, p. 137-144.

Experimental demonstration of rotating motion produced by two superimposed, mutually perpendicular, standing level sound waves. Photograph, diagrams. 7 ref.

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Determinations on liquid, amorphous, and crystalline glycerin between + 100 and −130 C. Diagrams, oscillograms, graphs. 3 ref.

10880* Theory of Energy Losses of Charged Particles Upon Passage Through a Ferromagnetic Substance. **K teorii poter' energii zariazhennykh chastits pri prokhozhdenii ferromagnetika.** (Russian.) D. Ivanenko and V. N. Tsytovich. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 3, Mar. 1955, p. 291-296.

Analysis and equations. 19 ref.

10881* Problem of the State of Copper Activator in Zinc-Sulfide Luminophores. **K voprosu o sostoianii aktivatora medi v tsink-sul'fidnykh liuminoforakh.** (Russian.) A. A. Cherepnev. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 28, no. 4, Apr. 1955, p. 458-462.

Includes graphs, tables. 12 ref.

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Data on effect of concentration of fluorescent dyes in connection with their optical properties and effect of transfer of excitation energy on the luminescence. Graphs, tables. 15 ref.

Books and Miscellaneous Publications

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Comprehensive treatise covers the methods of generating, detecting, and measuring ultrasonic frequencies; measurements of sound velocities and absorption in liquids and gases; determination of elastic and elastic-optical constants; and its applications in physics, chemistry, metallurgy, electrochemistry, telecommunications, biology, medicine, architecture, and nondestructive testing.

10884 Limit Distributions for Sums of Independent Random Variables. B. V. Gnedenko and A. N. Kolmogorov. (Translated from the Russian by K. L. Chung.) 264 p. 1954. Addison-Wesley Publishing Co., Cambridge, Mass. (QA273 G53ptr)

Probability distributions; random variables and mathematical expectations; infinitely divisible distributions; limit theorems for cumulative sums.

10885 Short Textbook on Physics. **Kurzes Lehrbuch der Physik.** (German.) H. A. Stuart. 304 p. 1954. Springer-Verlag, Berlin. (QC23 St91k)

Theory of vibrations and waves; mechanics, acoustics, heat, electricity, magnetism, and optics; theory of radiations and at. structure.

10886 Applications of Wave Mechanics to the Study of the Structure of Molecules. **Les applications de la mécanique ondulatoire a l'étude de la structure des molécules.** (French.) 223 p. 1953. Editions de la Revue D'Optique Théorique et Instrumentale, Paris. (QC174.2 B78a)

Compilation of reports on the role of the Broglie wave in mol. structures, infra-red spectrometry, electron spectra of organic mol., magnetic properties and structures of mol., and the microscopic observation of mol. and atoms.

10887 Results of the Exact Sciences. **Ergebnisse der Exakten Naturwissenschaften. v. XXVII.** (German.) 421 p. 1953. Springer-Verlag, Berlin. (QC21 Er38)

A group of papers dealing with electric breakdown of solid insulators, conduction in semi-conductors, energy of the light-atom nuclei, electron-microscopy, amplifiers, spectrographs, and scintillation counters.

PLASTICS

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Shows enhanced affinity for dispersed (acetate) and acid dyestuffs. Tables. 11 ref.

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10891 Applications for Plastics in the Manufacture of Storage Batteries. *British Clayworker*, v. 65, May 1955, p. 160-163, 197.

Continuous mass production requires large no. of polystyrene vent plugs and microporous PVC separators. Each vent plug is air tested before assembly onto a battery. Photographs.

10892 A Comparison of the Flow of High Polymers in the Cavity of a Mooney Plastometer. D. S. Fensom. *Canadian Journal of Technology*, v. 33, May 1955, p. 194-203.

From idealized Mooney plasticity-time curves for Butyl and GR-S synthetic rubber, the distinctive features of the various parts of the shearing curve are pointed out. Actual experimental curves are given for Butyl, GR-S, "Cold rubber", polyisobutylene, polybutadiene, polystyrene, and some natural rubber gum stocks. Graphs, tables, diagrams. 4 ref.

10893* Resistant Properties and Uses of Fluorocarbons. II. F. F. Jaray. *Corrosion Prevention and Control*, v. 2, May 1955, p. 25-27.

Review of the resistant properties of fluorocarbons and the growing scope for their employment. Photographs, tables.

10894 Emulsion Polymerization by Continuous Feed of Reactants. Laboratory Scale Production of High Solids Latex. Paul Fram, Graham T. Stewart, and Andrew J. Szlachtun. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1000-1005.

Semibatch process, giving excellent control of exothermic reactions, is used for a butyl acrylate–acrylanitrile copolymer. Tables, graphs, diagrams. 31 ref.

10895 Heat and Light Degradation of Vinyl Chloride Resin. L. H. Wartman. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1013-1019.

Evaluation of stabilizers shows that rapid reaction with HCl is desirable. Tables, graphs, diagrams. 7 ref.

10896* Some Physico-Mechanical Properties of Polyvinyl Alcohol Esters. **O nekotorykh fiziko-mekhanicheskikh svoistvakh slozhnykh efirov polivinilovogo spirta.** (Russian.) S. N. Ushakov and T. A. Kononova. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1955, no. 2, Mar.-Apr., p. 335-343.

Includes tables, graphs. 9 ref.

10897* Investigations of the Interaction of Vinyl Compounds and Polyfunctional Compounds. **Issledovaniia v oblasti vzaimodeistviia vinilovykh i polifunktsional'nykh soedinenii. IV.** Interaction of Vinylalkyl Esters With Glycerine, 1,2-Glycerine Acetals and 1,3-Glycerine Acetals. **O vzaimodeistvii vinilalkilovykh efirov s glitserinom, 1,2-glitserin- i 1,3-glitserinatsetaliami. V.** Interaction of Trivinylglycerine Ester With Monohydroxy Alcohols. **O vzaimodeistvii trivinilglitserinovogo efira s odnoatomnymi spirtami.** (Russian.) M. F. Shostakovskii, V. V. Zhebrovskii, and M. A. Medelianovskaia. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1955, no. 2, Mar.-Apr., p. 350-358.

Includes structural formulas. 10 ref.

10898* High-Molecular Compounds. **Iz oblasti vysokomolekuliarnykh soedinenii. LXXI.** Polycondensation of 1,2-Dichloroethane With Chlorobenzene in the Presense of Aluminum Chloride. **O polikondensatsii 1,2-dikhloretana s khlorbenzolom v prisutstvii khloristogo aliuminiia. LXXII.** Formation of a Trimer in the Reaction of Polyphenylene Ethyl With Dihaloidalkanes. **Ob obrazovanii trekhmera pri reaktsii polifenilenetila s digaloidalkanami. LXXIII.** Some Two-Component Mixed Polyamides. **O nekotorykh dvukhkomponentnykh smeshannykh poliamidakh.** (Russian.) G. S. Kolesnikov, V. V. Korshak, T. A. Soboleva, L. S. Fedorova, and T. M. Frundze. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1955, no. 2, Mar.-Apr., p. 359-379.

Includes graphs, tables. 52 ref.

10899 Determination of Thermal Stresses in Three-Ply Laminates. A. J. Durelli and C. H. Tsao. *Journal of Applied Mechanics*, v. 22, June 1955, p. 190-192.

Results of a photoelastic investigation on thermal stresses produced in a three-ply laminate, consisting of glass, polyvinyl butyral, and glass, when the temperature drops slowly from 70 to −20 F. Graphs, diagram, photograph.

10900 Electrical Relaxation Distribution Functions in Polymers and Their Temperature Dependence. John D. Ferry, Malcolm L. Williams, and Edwin R. Fitzgerald. *Journal of Physical Chemistry*, v. 59, May 1955, p. 403-408.

Data of previous authors reevaluated for polyvinyl acetal, acetate, chloroacetate, and polymethyl acrylate. Graphs. 29 ref.

10901 The Polymerization of Silicic Acid. Sidney A. Greenberg and David Sinclair. *Journal of Physical Chemistry*, v. 59, May 1955, p. 435-440.

A light scattering study of polysilicic acid made from ammonium acetate and Na metasilicate. Tables, graphs. 26 ref.

10902* Report on Molecular-Weight Measurements of Standard Polystyrene Samples. II. International Union of Pure and Applied Chemistry. H. P. Frank and H. F. Mark. *Journal of Polymer Science*, v. 17, May 1955, p. 1-20.

Viscometry, osmometry, light scattering, and ultracentrifuging results on a polymer fraction. Tables, graphs. 30 ref.

10903* The Preparation and Characterization of Block Copolymers. A. E. Woodward and G. Smets. *Journal of Polymer Science*, v. 17, May 1955, p. 51-64.

Copolymer of polystyrene and methyl methacrylate prepared with phthalyl peroxide catalysts; other monomers also used. Tables, graphs. 20 ref.

10904* Hydrogen Peroxide as Initiator in Vinyl Polymerization in Homogeneous Systems. I. Kinetic Studies. Uma Sankar Nandi and Santi R. Palit. *Journal of Polymer Science*, v. 17, May 1955, p. 65-78.

Studied in toluene, ethyl acetates, methyl ethyl ketone, and in bulk at 50, 60, 80, and 115 C. Tables, graphs. 15 ref.

10905* Gelatin of Concentrated Polyacrylonitrile Solutions. II. J. Bisschops. *Journal of Polymer Science*, v. 17, May 1955, p. 89-98.

Influence of temperature, concentration, polymer mol. wt., and water content. Tables, graphs. 15 ref.

10906* Molecular Weight of Polyvinyl Acetate by Light Scattering and Viscosity Techniques. S. N. Chinai, P. C. Scherer, and D. W. Levi. *Journal of Polymer Science*, v. 17, May 1955, p. 117-124.

A viscosity-wt. average mol. wt. relationship in acetone is derived. Table, graphs. 13 ref.

10907* New Machines for the Vacuum Molding of Thermoplastics. **Neue Maschinen für die Vakuumverformung thermoplastischer Kunststoffe.** (German.) Erich Escales. *Kunststoffe*, v. 45, no. 5, May 1955, p. 174-178.

German vacuum molding machines are described. Photographs, tables, diagrams.

10908* The Ufix Deep-Drawing Equipment for Thermoplastic Sheet. **Das Ufix-Tiefziehgerät für thermoplastische Kunststoff-Folien.** (German.) H. Behringer. *Kunststoffe*, v. 45, no. 5, May 1955, p. 178-179.

Equipment which permits the molding of thermoplastic sheet by simultaneous drawing and compressing between plunger and matrix, similar to the fabrication of sheet metal. Table, photographs.

10909* Automatic Temperature Control of Press Tools for Plastics Processing. **Automatische Temperaturregelung von Presswerkzeugen bei der Kunststoffverarbeitung.** (German.) Ernst Staudner. *Kunststoffe*, v. 45, no. 5, May 1955, p. 213-214, 216.

Special instruments for the automatic temperature control of molds are described. Diagrams, photographs.

10910* Some Problems of the Theory of Copolymerization. **Kopolimerizáció elméletének néhány kérdéséről. II.** (Hungarian.) György Thurzó. *Magyar Kémikusok Lapja*, v. 10, no. 4, Apr. 1955, p. 109-113.

Relationship between the structure of the monomers and the rate of growth reaction; decrease of the energy content of the radical; effect of the substitutes of the ethylene mol. on the distribution of the π electrons in space; the role of the substitutes in the sterical inhibition of the growth reaction. Graphs, structural formulas, tables. 32 ref.

10911 Here's How Vinyl-to-Metal Laminates Are Made and Used. *Modern Plastics*, v. 32, June 1955, p. 107-111, 230.

Light wt. luggage, fabricated of vinyl-to-Mg laminate, is durable and scuff resistant. Photographs.

10912 Temperature and Pressure Measurements in the Injection Machine Heating Cylinder. C. E. Beyer, R. B. Dahl, and R. B. McKee. *Modern Plastics*, v. 32, June 1955, p. 127 + 6 pages.

Effect of design factors on performance. Graphs, tables, diagrams.

10913 Viscosity Stability of Plastisols. J. R. Darby and P. R. Graham. *Modern Plastics*, v. 32, June 1955, p. 148 + 4 pages.

Procedures and equipment; effects of ester-type plasticizers, fillers, and extender plasticizers. Tables, graphs. 6 ref.

10914 Phillips Unveils Big Polyethylene Plan. John C. Reidel. *Oil and Gas Journal*, v. 53, May 2, 1955, p. 53.

First plant using new low-pressure, low-cost process is set for Houston; ethylene plant, and pipeline also planned.

10915 The Future of Vacuum Forming. *Plastics*, v. 20, May 1955, p. 136-137.

Development; economics of process; applications. Photographs, table.

10916* Recent Advances in Epoxy Resins. Elliott N. Dorman. *Plastics Technology*, v. 1, May 1955, p. 213-217, 236-237.

A comprehensive discussion of the resins, their curing systems, and industrial applications. Photographs, tables.

109717* Production Preparation for New Compression Molds. D. A. Dearle. *Plastics Technology*, v. 1, May 1955, p. 218-221, 236.

Planning and designing accessory mold equipment so as to avoid delays in placing new molds into full production. Table, diagrams.

10918* "Terylene" Reinforcing Fibre. *Rubber and Plastics Age*, v. 36, May 1955, p. 273, 275, 277.

Suggests "Terylene" for manufacture of reinforced plastic laminates. Table, photographs. 3 ref.

Plastics

10919* **"Cycolac" High-Impact Resin.** *Rubber and Plastics Age,* v. 36, May 1955, p. 289, 291.

Compounding and pigmentation; calendering; sheet forming; extruding; molding; finishing.

10920* **Acrylamide.** *Rubber and Plastics Age,* v. 36, May 1955, p. 293.

Potential applications.

10921 The Role of Foamed Plastics in Aircraft. Jay M. Stevens. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 1-H, 4 p. (TP986 So13p)

Use of foam to stabilize thin skinned aircraft structural parts. Graph, photograph.

10922 Contact Molding. C. A. McGill. *Society of Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 8, 3 p. (TP986 So13p)

Contact molding and its place in the field of reinforced plastics. Photographs.

10923 Bag Molding Techniques. James S. Lunn and I. M. Scott. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 9, 5 p. (TP986 So13p)

Bag film; mold selection; molding operations including vacuum, pressure, and autoclave; bleeding; the advantages and disadvantages of the various production steps involved in this work. Table, diagrams.

10924 Vacuum Injection Molding. George Lubin. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 11-A, 6 p. (TP986 So13p)

Method for producing large parts, having complex contours out of reinforced plastics. Photographs, diagrams.

10925 Matched Die Molding of Reinforced Thermoplastics by Injection Under Pressure. E. Y. Wolford. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 11-B, 6 p. (TP986 So13p)

Discusses characteristics of the process, material used, and advantages of the process. Tables.

10926 Preform and Mat Molding. Sol Fingerhut and Samuel S. Oleesky. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 11-C, 3 p. (TP986 So13p)

Economics of the method, molding problems, and tool design are covered.

10927 Controlling Flow Properties With Fillers. James R. Wilcox. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 27, 8 p. (TP986 So13p)

Influence on the flow properties and related characteristics (thixotropy) of the liquid resin. Tables, diagrams.

10928 Epoxy Tools Have Wide Application. John Delmonte. *Tool Engineer,* v. 34, June 1955, p. 117-118.

Tools designed with epoxies are light wt. and easily prepared. Photographs, graphs.

10929* Influence of Molecular Weight on the Mechanical Properties of Crystalline Polymers. **Vliianie molekuliarnogo vesa na mekhanicheskie svoistva kristallicheskikh polimerov.** (Russian.) V. A. Kargin and T. I. Sogolova. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 3, Mar. 1955, p. 469-475.

Properties of polyethylene and polyamide crystals. Graphs, tables. 5 ref.

10930* Synthesis of Benzyl Esters of Polyvinyl Alcohol. **O sinteze benzilovykh efirov polivinilovogo spirta.** (Russian.) S. N. Ushakov and E. M. Lavrent'eva. *Zhurnal Prikladnoi Khimii,* v. 28, no. 4, Apr. 1955, p. 407-413.

Degree of saponification of benzyl chloride. Alkaline concentration and vitrification temperatures in relation to degree of substitution (benzoxyl groups). Mechanical properties of films. Tables, graphs. 8 ref.

10931* Investigation of Dielectric Losses of Polyethylene. **Issledovanie dielektricheskikh poter' polietilena.** (Russian.) G. P. Mikhailov, S. P. Kabin, and B. I. Sazhin. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 590-594.

Relation of shear modulus, logarithmic decrement of damping and dielectric losses to temperature. Graphs, table. 8 ref.

10932* Problem of the Connection Between Electrical and Mechanical Relaxations in Polymers. **K voprosu o sviazi mezhdu elektricheskoi i mekhanicheskoi relaksatsiiami v polimerakh.** (Russian.) E. I. Chuikin. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 595-600.

Comparison of absorption of ultrasound in polyisobutylene and the measurements of dielectric losses. Graphs, drawing. 4 ref.

Books and Miscellaneous Publications

10933 Plastics in Building. Charles R. Koehler, editor. 149 p. 1955. Building Research Institute, Washington, D. C. (TA455.P7 N21p)

The uses, past and present, and the potentialities of plastics in building; standards and codes.

10934 Plastics Tooling. Malcolm W. Riley. Reinhold Pilot Book No. 6. 123 p. 1955. Reinhold Publishing Corp., New York. (TJ1185 R45p)

Up to date report on resins and methods used; major applications of plastics tooling.

See also:

10193 (plastic films for capacitors)
10214 (thermal aging of polymer dielectrics)
10379 (viscodilatometers for resins)
10384 (specification of colored plastics)
10797 (effects of radiation on polymers)
10953 (plastic aircraft fuel tanks)
10966 (silicones in the textile industry)

POLLUTION AND WASTES

10935* **The Bod of Textile Chemicals.** William Stafford and Harold J. Northup. *American Dyestuff Reporter,* v. 44, May 23, 1955, p. 355P-359P.

Data on the five-day biochemical O demand of about 154 textile chemicals. Table, graph. 8 ref.

10936* **The Estimation of Health Hazards From Air Pollution.** W. C. L. Hemeon. *Archives of Industrial Health,* v. 11, May 1955, p. 397-402.

Includes tables, graphs. 4 ref.

10937* **A Sampling Technique for Small Air-Borne Particulates.** J. D. Wilcox and W. R. Van Antwerp. *Archives of Industrial Health,* v. 11, May 1955, p. 422-430.

Particle-size distribution by combined use of light and electron microscopes. Photograph. 6 ref.

10938 Acid Plant Gas Scrubber. *Chemical and Engineering News,* v. 33, May 16, 1955, p. 2148-2149.

Olin Mathieson finds air-pollution control doubly profitable. Flowsheet.

10939 Reclaims Over 90% Filter Aid From Flue Gas. G. J. Krebs and Ted F. Meinhold. *Chemical Processing,* v. 18, June 1955, p. 14-15.

Uses wet type "Air-Tumbler" to recover 1500 lb. of filter aid per day. Diagrams, photographs.

10940 Processes and Equipment for Air Pollution Control. Paul L. Magill. *Industrial and Engineering Chemistry,* v. 47, May 1955, p. 931-981.

A symposium of seven papers, covering electrical precipitation, hot gas separation, activated C purification, and photochemical oxidation of SO_2. One additional paper is on air pollution literature. Diagrams, graphs, photographs, tables. 90 ref.

10941 Proceedings of the Ninth Industrial Waste Conference. *Industrial Waste Conference, Proceedings, Purdue University*, Ninth, 1954, 591 p. (TD897 In2p)

Fifty-three papers on many aspects of fluid and solid waste disposal.

10942 Waste Disposal—Vital to Atomic Power Development. John M. Warde and Raymond M. Richardson. *Mining Engineering*, v. 7, May 1955, p. 458-461.

Geologic and hydrologic features of release of radioactive wastes into the ground. Photographs, tables.

10943* Overfire Air Reduces Smoke on Small Boiler Burning Wastes. *Plant*, v. 11, May 1955, p. 66-67.

Photoelectric-cell operated smoke control system applicable to small boilers which dispose of combustible wastes by burning. Continuous recorder gives visual and permanent indication of equipment performance. Diagrams, photograph.

10944* Air Pollution Induced by Fuel Combustion and Processing. **L'inquinamento atmosferico dovuto all'uso o alla lavorazione dei combustibili.** (Italian.) C. Padovani. *Rivista dei Combustibili*, v. 9, no. 3, Mar. 1955, p. 179-209 + 4 plates.

Problems related to use of coal gas rich in CO, and exhaust gases from internal combustion engines. Measurement and analysis of contaminants; methods of reducing the emission of harmful agents to the atmosphere. Tables, diagram, graph. 22 ref.

10945* 1954 Literature Review. I. A Critical Review of the Literature of 1954 on Sewage, Waste Treatment, and Water Pollution. H. Heukelekian. *Sewage and Industrial Wastes*, v. 27, May 1955, p. 515-571.

Deals with analytical methods, sewage treatment, and radioactivity. Table. 428 ref.

10946* Oxygen Absorption Studies Using Mechanical Air Dispersers. A. A. Kalinske. *Sewage and Industrial Wastes*, v. 27, May 1955, p. 572-580; disc., p. 580-586.

Aeration devices used in chemical process industry; design of mechanical disperser and model tests; model test data; practical application and field verification. Graphs, photographs, diagram. 13 ref.

See also:

9995 (use of waste products in water purification)

RUBBER AND ELASTOMERS

10947 Perfluorinated Butadiene. A. L. Henne and Wm. Postelneck. *American Chemical Society, Journal*, v. 77, Apr. 20, 1955, p. 2334-2335.

A three-step synthesis. 4 ref.

10948 Rubber and Allied Substances as Anti-Corrosive Materials. B. J. Wilson. *Corrosion-Technology*, v. 2, Apr. 1955, p. 107-112.

Natural rubber; synthetic rubber; and rubber-like plastics including PVC, polyethylene, Saran, Teflon, and Kel-F. Photographs, table. 11 ref.

10949* Testing Rubber Products, Especially Conveyor Belts and Compressed-Air Tubes, Used in Mining. **Die Prüfung von Gummierzeugnissen, besonders von Fördergurten und Druckluftschläuchen, im Bergbau.** (German.) Heinrich Meiners. *Glückauf*, v. 91, nos. 15-16, Apr. 9, 1955, p. 406-416.

Methods and equipment. Table, diagrams, photographs, record blanks, graphs. 5 ref.

10950 Carboxylic Elastomers. Harold P. Brown and Carlin F. Gibbs. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1006-1012.

Technique and advantages of forming internal carboxyl groups are explained. Tables, graphs. 9 ref.

10951 Adsorption of Iodine and Bromine by Carbon Black. J. W. Watson and D. Parkinson. *Industrial and Engineering Chemistry*, v. 47, May 1955, p. 1053-1062.

No direct relationship between I adsorption and surface area was established. Tables, graphs. 19 ref.

10952* Influence of Carbon Black on Oxidation, Hysteresis and Wear of Rubber. G. J. van Amerongen. *Institution of the Rubber Industry, Transactions*, v. 31, Apr. 1955, p. 70-88.

Oxidation and solubility of O vary with surface area of the C black. Table, graphs, diagram. 13 ref.

10953* Rubber and Plastics in the Aircraft Tank Industry. J. P. Griffiths. *Institution of the Rubber Industry, Transactions*, v. 31; *Proceedings*, v. 2, Apr. 1955, p. 57-71.

Design mechanics, necessary requirements, and materials used. Diagrams. 19 ref.

10954* On the Vulcanization of Highly Elastic Polymerizates. **Zur Kenntnis der Vulkanisation hochelastischer Polymerisate. IV.** Investigations of Model Compounds. **Untersuchungen an Modellverbindungen.** (German.) Walter Scheele and Otto Lorenz. *Kautschuk und Gummi*, v. 8, no. 4, Apr. 1955, p. 85WT-90WT.

Study of the mechanism of vulcanization by reacting tetraethyl thurian-disulfide with geraniol and ZnO under N and atmospheric O. Tables, graphs. 11 ref.

10955* Strengthening Rubber With Resins Processed Into the Latex. **Verstärkung von Kautschuk mit in Latex aufbereiteten Harzen.** (German.) J. van Alphen. *Kautschuk und Gummi*, v. 8, no. 4, Apr. 1955, p. 96WT-101WT.

Effect of resins on the properties of rubber. Tables, graphs, micrographs. 12 ref.

10956* Effect of the Ingredients of Rubber on Its Friction During Sliding. **Vliianie ingredientov reziny na ee staticheskoe trenie pri skol'zhenii.** (Russian.) S. B. Ratner and V. D. Sokol'skaia. *Khimicheskaia Promyshlennost'*, 1955, no. 1, Jan.-Feb., p. 27-34.

Effect of hardness, fillers, softeners, and degree of vulcanization on friction properties. Graphs, tables. 26 ref.

10957* Penetration of High Polymer Solutions Into Rubber and Leather. **Proniknovenie rastvorov vysokopolimerov v rezinu i kozhu.** (Russian.) G. A. Blokh, S. B. Kalika, G. I. Laevskaia, E. Ia. Reznichenko, and E. V. Tsipeniuk. *Legkaia Promyshlennost'*, v. 15, no. 4, Apr. 1955, p. 40-42.

Depth of penetration of rubber cement tested, using radioactive sulfur. Diagrams.

10958* Milling Procedure; Its Effect on Physical Properties. B. J. A. Martin and D. Parkinson. *Rubber Chemistry and Technology*, v. 28, Jan.-Mar. 1955, p. 261-277.

Variations are small and independent; most responsive properties are plasticity, scorch, tear resistance, and electrical resistivity. Tables, graphs. 18 ref.

10959* Organic Isocyanates. G. S. J. White. *Rubber and Plastics Age*, v. 36, May 1955, p. 267, 269, 271.

Particular attention to elastic and rigid foams; the latter being of value in aircraft construction.

10960* Constant Power Principle in Abrasion Testing. E. F. Powell and S. W. Gough. *Rubber World*, v. 132, May 1955, p. 201-210.

Development of a laboratory test intended primarily for assessment of tire tread compounds. Diagram, photographs, graphs, tables. 11 ref.

10961* Vulcanization of Butadiene Styrol Rubber in the Presence of Sulfenamide Accelerators. **Vulkanizatsiia butadienstirol'nogo kauchuka v prisutstvii sul'fenamidnykh uskoritelei.** (Russian.) B. Dogadkin. *Zhurnal Prikladnoi Khimii*, v. 28, no. 5, May 1955, p. 533-542.

With this compound, vulcanization is possible without activator ZnO. Character of bonds. Properties of the vulcanization products thus obtained. Graphs, table. 5 ref.

See also:

10027 (butadiene rubber)
10213 (humidity effects on electrical insulators)
10892 (flow properties of rubber)

SPACE HEATING AND CONDITIONING

10962* Industrial Air Conditioning. **Klimatyzacja przemysłowa.** (Polish.) J. Potyński. *Przemysł Chemiczny*, v. 11, no. 3, Mar. 1955, p. 110-113.

Discussion of types of air conditioning units. Calculation of moisture in air, heat exchange, and other factors. Diagrams, graphs.

Books and Miscellaneous Publications

10963 Plant and Process Ventilation.. W. C. L. Hemeon. 437 p. 1955. Industrial Press, New York. (TH7653 H37p)

Data and procedure using principles developed from wide experience and extended by engineering analysis. Covers behavior of contaminants in air; materials handling; enclosed processes; hot processes; general and local exhaust; air cleaning; duct, hood, and booth design.

TEXTILES AND FIBERS

10964* Comparative Solubilities of Natural and Man-Made Fibers. Siegfried S. Praeger. *American Dyestuff Reporter*, v. 44, Apr. 25, 1955, p. 281-282.

Solubilities in $ZnCl_2$. Tables. 8 ref.

10965* A Review of Several Methods of Hydrosulfite Analysis With Special Regard to Control of Vat Dyebaths. A. Airoldi and F. Marchi. (Translated from the Italian by P. J. Wood.) *American Dyestuff Reporter*, v. 44, Apr. 25, 1955, p. 283-288.

Includes tables, diagram. 13 ref.

10966* Progress of Silicones in the Textile Industry. F. L. Dennett. *American Dyestuff Reporter*, v. 44, Apr. 25, 1955, p. 293P-295P.

Includes photographs, tables. 2 ref.

10967 Acrylics Speed Into New Outlets. *Chemical Week*, v. 76, May 21, 1955, p. 96, 98-99.

Study of the promising position of the Acrilan Dynel, and Orlon fibers. Table.

10968* Glycerine in Textile Printing. Milton A. Lesser. *Textiles Industries*, v. 119, June 1955, p. 166 + 4 pages.

Includes tables, photographs. 26 ref.

10969 A Rapid Method for the Volumetric Determination of Antimony, Copper, or Iron in Textile Materials. A. G. Hamlin. *Textile Institute, Journal*, v. 46, Apr. 1955, p. 247T-255T.

Includes tables, graphs. 5 ref.

10970 The Adsorption of Primary Alcohols by Wool. C. H. Nicholls and J. B. Speakman. *Textile Institute, Journal*, v. 46, Apr. 1955, p. 264T-282T.

Includes graph, tables. 4 ref.

10971* Evaluation of Yarn Properties and Processing Performance of Pima S-1 Cotton. John J. Brown, Nathaniel A. Howell, Louis A. Fiori, and Jack E. Sands. *Textile Research Journal*, v. 25, May 1955, p. 404-414.

Includes tables, graphs, micrographs. 5 ref.

10972* New Equipment and Methods Highlight Cotton Clinic. *Textile World*, v. 105, May 1955, p. 102-107, 188, 190.

Papers cover an experimental carding cleaner, improved airflow fineness tester, new electrical yarn-imperfection counter, twistless yarns, fabric properties of military goods, and processing performance of Pima S-1. Table, diagrams, photographs.

10973* How Rex Mills Doubled Nylon-Carding Production. John F. de Bordenave. *Textile World*, v. 105, May 1955, p. 112-113.

Doffer speed of 7 r.p.m. boosted production from 3.5 to 7-lb. per hr.; significant changes in other speeds and settings were also made; waste is down considerably; evenness and appearance are good. Diagram, photographs.

10974* Statistical Quality Control in a Filament Weaving Plant. Ernest R. Bechner. *Textile World*, v. 105, May 1955, p. 131, 133, 202, 204.

Steps necessary to set up statistical methods for controlling quality in a filament weaving plant.

See also:

10032 (dyeing of Dacron)
10935 (B.O.D. of textile chemicals)

WELDING AND JOINING

10975* Adhesives and Adhesive Bonding of Metals and Plastics. II. George Epstein. *Adhesives & Resins*, v. 3, Mar. 1955, p. 64-72.

Adhesives in sandwich construction; adhesive bonding, procedures and requirements. Photographs, table. 3 ref.

10976 Hard Soldering. R. C. Jewell. *Automobile Engineer*, v. 45, May 1955, p. 213-216.

Thesscal process for aluminum and aluminum alloys. Photographs, tables.

10977 A Further Examination of the Welding and Tensile Properties of Some Al-Zn-Mg Alloys Containing Copper. W. I. Pumphrey and D. C. Moore. *British Welding Journal*, v. 2, May 1955, p. 206-215.

Extent of the heat-affected zones produced by oxy-acetylene and argon-arc welding in fully heat-treated alloys; effect on weld cracking using filler-rod alloys. Tables, photographs, graphs. 6 ref.

10978* Cast Iron and Its Welding. **El hierro fundido y su soldadura.** (Spanish.) Salvador M. Checa Casajús. *Ciencia y técnica de la Soldadura*, v. 5, no. 22, Feb. 1955, 14 p.

Physico-chemical aspect of the fusion; influence of certain chemical elements; types of welding and optimum conditions. Graphs, tables, diagrams.

10979* Flash Welding. **Soldadura por chispa.** (Spanish.) Evert H. Bylin. *Ciencia y técnica de la Soldadura*, v. 5, no. 22, Feb. 1955, 13 p.

Influence of different factors on the quality of the welding joint; fields of application. Diagrams, graphs.

10980* Welding With Austenitic Alloyed Steel Electrodes. **Soldadura con electrodos austeniticos de aceros aleados.** (Spanish.) M. de Miró and J. L. Zuloaga. *Ciencia y técnica de la Soldadura*, v. 5, no. 22, Feb. 1955, 9 p.

Mechanical properties of welded seams; composition of the electrodes. Tables, micrographs, diagrams.

10981* The Athyweld Process. *Edgar Allen News*, v. 34, May 1955, p. 97-101.

Method of at. H welding of toolsteel which permits close C control. Diagrams, photograph.

10982* Investigation of the Solders of the Silver-Copper Group. **A réz-ezüst rendszerbe tartozó forras-zanyagok vizsgálata.** (Hungarian.) Ilona Waldhauser. *Kohászati Lapok*, v. 10, no. 4, Apr. 1955, p. 176-180.

Properties of solders used in vacuum technology; microscopic investigation of their structure in the cast state. Micrographs, graphs, tables.

10983 Butt-Welding Rings for Gas Turbines. *Machinery (London)*, v. 86, Apr. 29, 1955, p. 919-924.

Lengths of extruded sections are formed into rings by conventional methods in preparation for the flash butt welding operation. Photographs.

10984 Welding Cracks in Columbium-Bearing Stainless Steel. *Metal Progress*, v. 67, May 1955, p. 109-111.

Modifications in welding rod and base metal compositions and improved welding techniques have considerably reduced their occurrence. Micrographs. 1 ref.

10985 Weldability of Low-Alloy Vanadium Steels. (Digest of "Weldability of Twelve Low-Alloy Steels Containing Vanadium," by B. J. Bradstreet; *Welding Research*, v. 7, Oct. 1953, p. 107-110.) *Metal Progress*, v. 67, May 1955, p. 180, 182, 184.

Weldability was assessed in terms of the resistance to crack formation in the heat-affected zone adjacent to a restrained weld under controlled conditions of cooling. Tables.

10986* Increasing the Strength of Welded Cylindrical Reservoirs. **Usilenie prochnosti svarnykh tsilindricheskikh rezervuarov.** (Russian.) A. S. Fal'kevich. *Neftianoe Khoziaistvo*, v. 3, no. 5, May 1955, p. 69-77.

Types of cracking and failures; types of welding recommended for new and in-service tanks. Diagrams, graph, photograph, table.

10987* Latest in Butt-Welding. Long Rails by Flash Process. *Railway Age*, v. 138, June 6, 1955, p. 26-29.

Technique developed in Europe for fabrication of continuous rail has been adapted for use here and is now producing welds on the Santa Fe. Photographs, diagram.

10988* Tecumseh Uses Silver Alloy Brazing for Quality, Mass Production Joining. Victor Humble. *Refrigerating Engineering*, v. 63, May 1955, p. 46-49, 121.

The range, variety, and adaptability of the process. Photographs.

10989* Cold Welding of Aluminum and Copper Conductors. **Kholodnaia svarka aliuminievykh i mednykh provodov.** (Russian.) K. K. Khrenov and G. P. Sakhatskii. *Svarochnoe Proizvodstvo*, 1955, no. 4, Apr., p. 1-4.

Cold welding instruments and techniques; strength properties of cold welds. Photographs, diagrams, table.

10990 Spot Welding of High-Tensile Steels. P. Joumat. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 357-360.

A method for determining the settings of resistance-welding machines. Diagrams, photographs. 2 ref.

10991 An Examination of Fusion-Welding Processes Suitable for Vitreous Enamelling. B. Trehearne. *Sheet Metal Industries*, v. 32, no. 337, May 1955, p. 361-362.

Methods of welding examined were metallic arc, A arc, oxyacetylene, and at. H. Table. 2 ref.

10992* High-Frequency Welding Machine. **Hoog-frequent apparaat.** (Dutch.) K. K. Zwart. *Smit Mededelingen*, v. 10, no. 1, Jan.-Mar. 1955, p. 7-15.

Machine includes H.F. apparatus to prevent extinction of the arc. Diagrams, graphs, table.

10993 A High Temperature Structural Adhesive. S. E. Susman. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings*, 1954, sec. 7-I, 10 p. (TP986 So13p)

Physical properties and versatility of the resulting adhesive in processing and application to production materials and use. Table, diagrams, graphs, photographs.

10994* Welding of Light Alloys in Automotive Production (Application to the 1954 Dyna-Panhard). **Le soudage des alliages légers dans la construction automobile. Application à la Dyna-Panhard 1954.** (French.) A. Bernier. *Soudage et Techniques Connexes*, v. 9, nos. 1-2, Jan.-Feb. 1955, p. 17-31.

Welding of Al-3% Mg alloy used for car bodies under conditions of mass production. Methods and installation. Tables, diagrams, photographs.

10995* Welding of Clad Steels. **Le soudage des aciers plaqués.** (French.) L. F. Denaro and J. Hinde. *Soudage et Techniques connexes*, v. 9, nos. 3-4, Mar.-Apr. 1955, p. 63-76; disc., p. 76-80.

Methods adaptable for Ni, monel, inconel, austenitic, and Cr clad steels. Heat treatment precautions. Tables, diagrams, schematic drawings, photographs. 16 ref.

10996* Construction of Welded Condensers and Exchangers. **Construction soudée de condenseurs et d'échangeurs.** (French.) R. Piéplu. *Soudage et Techniques connexes*, v. 9, nos. 3-4, Mar.-Apr. 1955, p. 91-96.

Materials; method of welding; examples. Tables, photographs.

10997* Spot Welding of High-Strength Steel. **Soudage par points des aciers à haute résistance.** (French.) P. Joumat. *Soudage et Techniques connexes*, v. 9, nos. 3-4, Mar.-Apr. 1955, p. 97-100.

Method for determining the regulation of resistance welding machines. Drawing, photographs, charts.

10998 High-Strength, Butt-Brazed Joints. Orville T. Barnett and Nikolajs Bredzs. *Steel*, v. 136, May 23, 1955, p. 114, 117.

This technique gives pure Ag filler metal a tensile strength of 84,000 psi. before failing. Photograph, graph.

10999 Resistance Welding May Be the Answer. Thomas F. Hruby. *Steel*, v. 136, May 30, 1955, p. 70-72.

Review of advantages and applications of spot, projection, flash, and seam welding. Photographs.

11000 New Record for All-Welded Construction. W. L. Doherty. *Steel*, v. 136, May 30, 1955, p. 74-75.

Applications, advantages, and methods of hidden-arc welding in fabrication of buildings, bridges, and other structures. Photographs.

11001* Resistance Welding of Pipes in a Protective (Gas) Medium. **Svarka soprotivleniem trub v zashchitnoi srede.** (Russian.) N. S. Kabanov. *Svarochnoe Proizvodstvo*, 1955, no. 4, Apr., p. 5-9.

Micro-structure and strength properties of welds. Tables, diagram, micrographs. 3 ref.

11002* Formation of Pores During Welding, by a Melting Electrode, in Protective Gases. **Obrazovanie por pri svarke plaviashchimsia elektrodom v zashchitnykh gazakh.** (Russian.) N. M. Novozhilov. *Svarochnoe Proizvodstvo*, 1955, no. 4, Apr., p. 9-13.

Rust was found to be the cause of pore formation. Tables, chart, photographs. 7 ref.

11003* Investigation of the Contact Butt-Welding of Cast Iron. **Issledovanie kontaktnoi stykovoi svarki chuguna.** (Russian.) I. R. Patskevich and V. M. Shakhmatov. *Svarochnoe Proizvodstvo*, 1955, no. 5, May, p. 1-4.

Flash welding, with and without preheating, according to several procedures. Micro-structure (martensitic-austenitic, perlitic, etc.) in and beyond weld area; inclusions. Mechanical properties. Tables, micrographs, graph.

11004* Increasing the Strength of Welded Rails of New-Type Steels by Means of Mechanical and Heat Treatment of the Butt Joints. **Povyshenie prochnosti svarnykh rel'sov iz stalei novykh marok putem mekhanicheskoi i termicheskoi obrabotki stykov.** (Russian.) I. Z. Genkin. *Svarochnoe Proizvodstvo*, 1955, no. 5, May, p. 5-9.

Comparison of fatigue strength, etc. of whole rails, bolt joints, and rails welded by contact, thermit, and other methods. Effect of polishing, annealing, etc. Micro-structure of steels at weld union. Tables, graphs, micrographs, diagrams.

11005* Method of Calculating the Relative Economy of Different Operations by Oxygen Cutting. **Metodika rascheta sravnitel'noi ekonomichnosti razlichnykh rezhimov kislorodnoi rezki.** (Russian.) S. G. Guzov. *Svarochnoe Protzvodstvo*, 1955, no. 5, May 1955, p. 9-11.

Calculative factors include thickness of steel to be cut, cost of operation of gas cutter, whether cutting is straight or figure, etc. Graphs, table.

11006* Shielded Metal-Arc One-Pass Welding of Longitudinal and Circular Seams of Boiler Drums. **Elektroshlakovaia odnoprokhodnaia svarka prodol'nykh i kol'tsevykh shvov kotel'nykh barabanov.** (Russian.) I. D. Davydenko. *Svarochnoe Proizvodstvo*, 1955, no. 5, May, p. 11-13.

Techniques. Type of current, thickness of electrode wire and amount of melted, strength of welding current. Flux fosters formation of protective slag covering. Diagrams, table.

11007* Weld-Cast Assemblies of a Steam Turbine. **Svarnolitye uzly parovoi turbiny.** (Russian.) S. I. German. *Svarochnoe Proizvodstvo*, 1955, no. 5, May, p. 14-16.

Welding techniques for the correction of casting defects in thick-walls of cast parts of complex configuration. Conditions of heat treatment during welding. Fluxes used. Mechanical properties and micro-structures. Graphs, micrographs, photographs, table.

11008* Use of Welding to Repair the Cylinders of Powerful Hydraulic Presses. **Vosstanovlenie svarkoi tsilindrov moshchnykh gidravlicheskikh pressov.** (Russian.) K. P. Voshchanov. *Svarochnoe Proizvodstvo*, 1955, no. 5, May, p. 16-20.

Welding and Joining

Techniques for repair of casting defects and cracks developed in service. Equipment for preheating and building up of deposits. Diameter of electrode and current strength prescribed for the several layers to be welded. Diagrams, tables, graph, photograph.

11009* Problem of the Depth of Weld Penetration in Manual Welding. **O voprosu o glubine proplavleniia pri ruchnoi svarke.** (Russian.) A. S. Chesnokov. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 24-27.

Calculation of factors in electric arc welding; electrode diameters, current strength, seam parameters. Problem of T-shaped welds. Composition of weld. Mechanical properties. Graphs, tables, diagrams.

11010 Welding Methods and Acid Resisting Alloys Used in Germany. (Review of "Recent Welding Developments in Apparatus and Tank Construction", by H. Engstler; "The Acid Resistance of Low-Nickel, High-Chromium Alloys With Molybdenum and Copper Additions", by W. Tofaute and H. J. Rocha; "Welding in Modern Shipbuilding", by K. Holand; *Technische Mitteilungen Krupp,* v. 3, June 1954.) *Metal Progress,* v. 67, June 1955, p. 194, 196, 198.

Review of progress in welding; covers the submerged-arc welding practices and the economies that can be obtained from the higher metal deposition this process offers over manual welding with covered electrodes.

11011 Tig Welding With a CO_2 Shield. Edward J. Vogel and D. F. Zimmerman. *Welding Engineer,* v. 40, June 1955, p. 28-29, 62.

Report on tests wherein CO_2 was used as an additional shielding medium in the W-inert gas method. Diagram, photograph, table.

11012 Filler Metals for Joining. Orville T. Barnett. *Welding Engineer,* v. 40, June 1955, p. 30-32.

Discussion of the E6010 electrode group. Photograph, diagrams, tables. 2 ref.

11013 Welding Brass Strip. Arthur I. Heim. *Welding Engineer,* v. 40, June 1955, p. 34-37.

Progress report on procedures used commercially.

11014 Hardenability Evaluation of Welding Electrodes. Leo M. West. *Welding Journal,* v. 34, May 1955, p. 399-404.

Evaluation of mechanical properties of alloy steel weld deposits after heat treatment. Photographs, graphs, diagrams, tables.

11015 Semi Automatic Multiple Flame Brazing Larger Brass Electronic Components. J. W. Weyers. *Welding Journal,* v. 34, May 1955, p. 405-412.

Equipment and methods for brazing rectangular brass tubing to heavy brass flanges. Photographs, graphs, diagrams.

11016 Fusion Welding Unalloyed Titanium Sheet Without Filler Rod. Alan V. Levy and Robert Wickham. *Welding Journal,* v. 34, May 1955, p. 413-419.

Welding procedures and equipment; properties of welds. Photographs, tables.

11017 Iron-Powder Electrodes—A Progress Report. Jerry Hinkel. *Welding Journal,* v. 34, May 1955, p. 440-445.

A review of the first year's history of Fe-powder electrodes and a summary of the experience that has been gained since their introduction. Photographs, diagrams.

11018 Further Studies of the Flash Welding of Steels. E. F. Nippes, W. F. Savage, G. Grotke, and S. M. Robelotto. *Welding Journal,* v. 34, May 1955, p. 223S-240S.

Weld centerline rates of cooling at 1300, 1000, and 900 F in flash welds in AISI 1020 and 4340 steels, prepared under similar conditions, were measured and compared. Cooling rate is not influenced by the composition of the steel if the specimen geometry, platen acceleration, and final clamping distance are maintained constant. Tables, graphs. 11 ref.

11019 The Flash Welding of Commercial Molybdenum. II. E. F. Nippes and W. H. Chang. *Welding Journal,* v. 34, May 1955, p. 251S-264S.

Production and testing of flash welds of Mo; optimum values of upset distance assists in eliminating entrapped oxide in arc-cast and sintered Mo and reduces carbide precipitation in arc-cast Mo. Special consideration is needed for the higher C arc-cast Mo. Micrographs, photographs, tables, diagram, graphs. 4 ref.

11020 Applications of Argonaut Welding to Carbon Steel. R. L. Fannon and V. C. Herbert. *Welding and Metal Fabrication,* v. 23, May 1955, p. 161-165.

Development of a suitable filler wire and gas mixture, and a welding technique for use on certain grades of killed and semi-killed steel. Radiographs, micrographs, photographs.

11021 Stainless Steel Fabrication Saves £350,000. Thomas A. Dickinson. *Welding and Metal Fabrication,* v. 23, May 1955, p. 166-168.

Use of inert gas-shielded arc welding equipment for fabrication of stainless steel rings. Photographs, diagrams.

11022 Welding Developments in Germany. I. C. Fritz. *Welding and Metal Fabrication,* v. 23, May 1955, p. 169-176.

Growth of welding practices in recent years. Photographs.

11023 Hard Soldering of Aluminium and Aluminium Alloys by the Thesseal Process. R. C. Jewell. *Welding and Metal Fabrication,* v. 23, May 1955, p. 179-182.

Improved method of joining, not involving fusion of the parent metal, to fill the gap between the existing methods of soft soldering operating at 250 C or less, and brazing operating at approximately 600 C. Photographs, tables.

11024 Resistance Welding for the Wire Worker. III. R. H. Jordan. *Wire Industry,* v. 22, May 1955, p. 489-490, 492.

Some aspects of resistance welding as used in wire goods production. Photographs.

See also:

10576 (torsion testing of steel welds)
10639 (Ti spot welding)
10777 (spot welding quality control)
10778 (examination of welds)

WOOD AND FOREST PRODUCTS

11025 The Technology of Paper Coating. IV. *Paint, Oil & Chemical Review,* v. 118, May 19, 1955, p. 16 + 8 pages.

Vinyl coatings, rubber derivatives, and nine miscellaneous materials.

11026* Beater Additives in Papermaking. P. B. Davidson. *Paper Mill News,* v. 78, May 21, 1955, p. 53 + 5 pages.

Several so-called beater addatives are evaluated for their influence on engine sizing of paper. Tables, graphs.

11027* Fire Protection at Harmac Began With the Design of the Mill. D. Watts. *Pulp and Paper Magazine of Canada,* v. 56, May 1955, p. 117.

Fire protection measures for papermill. Photograph.

11028* Rolls & Roll Grinding. I. Roll Specifications (Newsprint Machines). II. Paper Machine Roll Crowns and Their Determination. III. Roll Grinding Machines and Procedures. IV. Dynamic Roll Balancing. R. E. Franklin, A. Glen, G. E. Backer, and A. E. Gendron. *Pulp and Paper Magazine of Canada,* v. 56, May 1955, p. 121-144.

Maintenance and repair of paper-machine rolls. Diagrams, graphs, tables, photographs. 4 ref.

11029* Problems of Microscopic Paper Investigation. **Probleme der mikroskopischen Papieruntersuchung.** (German.) Hans Bucher. *Textil-Rundschau,* v. 10, no. 4, Apr. 1955, p. 179-187.

Study of the micro-structure of wood fibers and paper; distinguishing groups of fibers with the aid of pigments; quantitative determination of fibers in paper; methods of preparing wood for paper production. Micrographs, photographs. 12 ref.

11030* Status and Development of Cutting and Non-Cutting Methods of Working Wood. **Stand und Entwicklung der spangebenden und spanlosen Holzbearbeitung.** (German.) F. Kollmann. *VDI Zeitschrift,* v. 97, nos. 11-12, Apr. 15, 1955, p. 355-362.

Includes diagrams, photographs. 27 ref.

See also:

10165 (paper coating)